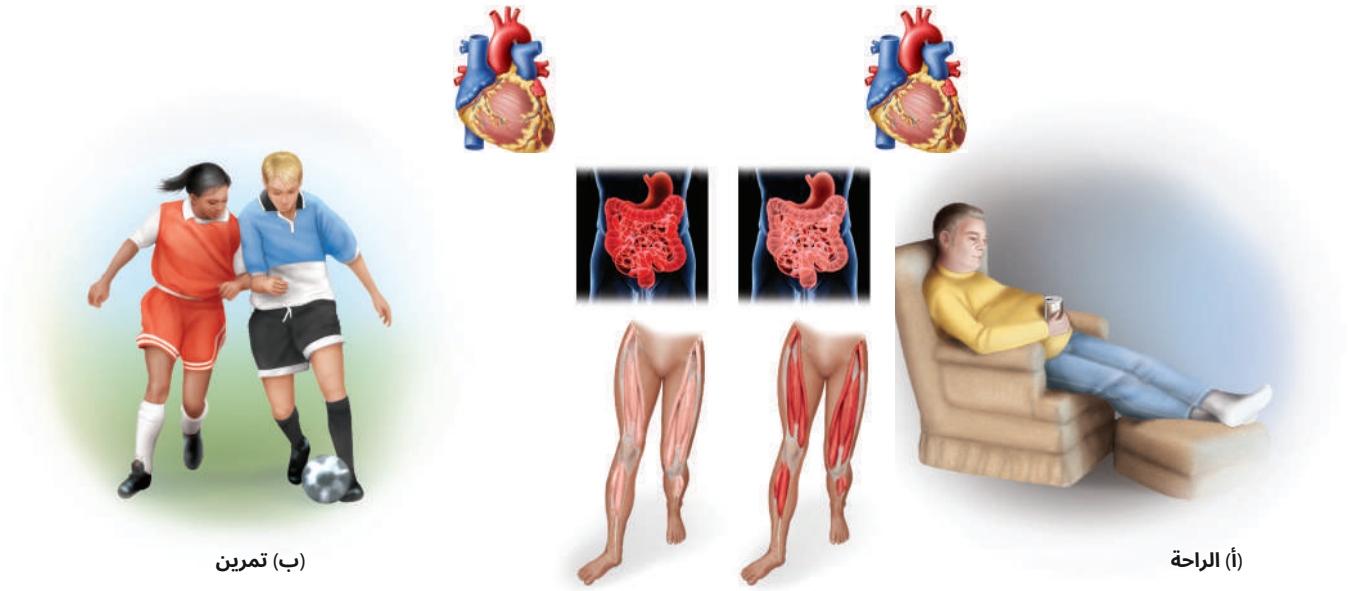


الشكل20.17إعادة توجيه تدفق الدم استجابةً لتغير الاحتياجات الأيضية.(أ) بعد تناول الطعام، تعُطى الأمعاء الأولوية في تدفق الدم، بينما تتلقى العضلات الهيكليةتدفقاً أقل نسبياً. ب) أثناء التمرين، تعُطى العضلات أولوية أعلى. ويحدث التغير في تدفق الدم، الذي يعُيد توجيه هذا التدفق، بشكل رئيسي على مستوى الشرايينالصغيرة في الأعضاء المعنية.

يقومالشريان المساريقي بتوجيه الدم إلى الأمعاء الدقيقة، حيث يكون ضرورياً لامتصاص العناصر الغذائية التي يتم هضمها.

منناحية أخرى، أثناء التمارين الرياضية الشاقة، تتوسع الشرايين في الرئتينوالدورة الدموية التاجية والعضلات. ولزيادة تدفق الدم في هذه المسارات،يجب أن يحدث انقباض الأوعية الدموية في أماكن أخرى، مثل الكليتينوالجهاز الهضمي.(**الشكلان 20.17ب، 20.18**). يؤدي ذلك إلى تقليلتدفق الدم إليها مؤقتاً، مما يتيح المزيد من الدم للأعضاء المهمة أثناءالتمرين. وبالتالي، يمكن للتغيرات الموضعية في المقاومة المحيطية أنتحُولّ تدفق الدم من جهاز عضوي إلى آخر لتلبية الاحتياجات الأيضية المتغيرةللجسم.

قبلأن تتابع

أجبعن الأسئلة التالية لاختبار فهمك للقسم السابق:

7.اشرح لماذا يؤدي انخفاض ضغط الدم الانبساطي إلى ارتفاع ضغط النبضحتى لو بقي ضغط الدم الانقباضي ثابتاً. كيف يمكن أن يؤثر هذاالارتفاع في ضغط النبض سلباً على الأوعية الدموية؟

8.اشرح لماذا يكون تدفق الدم الشرياني نابضاً بينما يكون تدفق الدم الوريدي غير نابض.

9.ما هي المتغيرات الثلاثة التي تؤثر على مقاومة تدفق الدم في الأطراف؟ أيمنها أكثر عرضة للتغير من دقيقة إلى أخرى؟

10.ما هي الآليات الثلاث الرئيسية للتحكم في نصف قطر الأوعية الدموية؟اشرح كل منها بإيجاز.

11.اشرح كيف يعمل منعكس الضغط كمثال على التوازن الداخلي والتغذيةالراجعة السلبية.

12.اشرح كيف يمكن للجسم أن يحول تدفق الدم من جهاز عضوي إلى آخر.

20.3 الشعيراتالدموية وتبادل السوائل

مخرجاتالتعلم المتوقعة

بعدإتمام هذا القسم، ينبغي أن تكون قادراً على

أ.صف كيف تنتقل المواد من الدم إلى الأنسجة المحيطة؛

ب.وصف وحساب القوى التي تمكنّ الشعيرات الدموية من إطلاق السوائلوإعادة امتصاصها؛ و

ج.صف أسباب وآثار الوذمة.

لاتتجاوز كمية الدم الموجودة في الشعيرات الدموية 250 إلى 300 مل (5%) في أي وقت. ومع ذلك، يعُد هذا الجزء من الدم هو الأهم في الجسم،إذ تتم عمليات التبادل بين الدم والأنسجة المحيطة به بشكل رئيسيعبر جدران الشعيرات الدموية.**التبادل الشعري**يشير هذا إلى حركةالسوائل في كلا الاتجاهين.

تشملالمواد الكيميائية التي يفرزها الدم الشعيري إلى الأنسجة المحيطةبالأوعية الدموية الأكسجين والجلوكوز ومغذيات أخرى، بالإضافة إلىالأجسام المضادة والهرمونات. أما المواد الكيميائية التي تمتصها الشعيراتالدموية فتشمل ثاني أكسيد الكربون وفضلات أخرى، والعديد منالمواد نفسها التي تفرزها: الجلوكوز والأحماض الدهنية المحُررة من مخازنهافي الكبد والأنسجة الدهنية؛ والكالسيوم والمعادن الأخرى المحُررة منالعظام؛ والأجسام المضادة التي تفرزها الخلايا المناعية؛ والهرمونات التيتفرزها الغدد الصماء. وبالتالي، فإن العديد من المواد الكيميائية تنتقلفي اتجاهين بين الدم والنسيج الضام، حيث تغادر الشعيرات الدمويةمن نقطة وتدخل من نقطة أخرى. وإلى جانب كل هذه المواد المذابة،هناك حركة كبيرة للماء من وإلى مجرى الدم عبر جدران الشعيرات الدموية.كما يحدث تبادل كبير عبر جدران الوريدات، إلا أن الشعيرات الدمويةتعُد موقع التبادل الأكثر أهمية نظراً لكثرة عددها مقارنةً بالوريدات.

rectitude'.[56] Cicero, nonetheless, does not want to force the term onto his readers and so says *sed haud scio an recte ea virtus frugi*, an instance of the rhetorical *captatio benevolentiae*.[57] The term seems to have become used in a narrower sense in Cicero's earlier speeches, something like the opposite of avarice: *nunc vero quid? furacis iudicii Homo frugi nonne sis in laudibus?* (*Verr.* 2.1.92). In the *Pro Scauro* he uses the abstract term as a play on Piso's name 'Frugi' but without any real definition. In the *Pro Gnaeo Plancio*, a similar general notion is implied by the term when likening the good qualities in a slave (*frugi, dili, bonus*) to the ones of a magistrate, hence the idea of 'economical' or 'useful'. However, it is not until 45 BC, when Cicero composed the *Tusculanae*, that he explicitly linked it with the Stoic virtue of the Sage (that of σωφροσύνη) and wrote that we should not understand it in the ordinary, 'narrow' sense, as he says: *quae nisi tanta et si ita, si quis in hoc tantopere inhaerebit, ridicula sunt*. Rather, it is with this more philosophical meaning that he later (in November 45 BC) ventures to use this wider meaning in the context of a defence of King Deiotarus at Caesar's home:

> This king is an exemplar of all the virtues, as I think you, Caesar, know well enough; but in nothing is he more remarkable and more admirable than in his sobriety (*frugi*), although I know that kings are not commonly praised in such terms. To be called a sober person does not convey many commendations to a king. Bravery, justice, earnestness, dignity, magnanimity, liberality, kindliness, generosity—these are the qualities we commend in a king; sobriety in a subject. Everyone is free to put what construction he pleases upon my words; nonetheless, I pronounce sobriety, by which I mean moderation (*modestia*) and temperance (*temperantia*), to be the highest of virtues.[58]

Cicero expresses the need to gloss his own semantic extensions of *frugalitas* with *modestia* and *temperantia*. In doing so, he conveys in the term more than its customary usage, hence he admits it originally would not be a common platitude applied to a king. Nonetheless, the new ethical meaning of *frugalitas*

56 See FORSYTHE (1994), 25; see e.g. Cic. *Fin.* 3.39.

57 See also FÖGEN (2011), 457.

58 *Dei regis omnes in illo, quod tu quoque, Caesar, optime scis, virtutes exstiterunt; sed nihil eius modi proprium est quod non in aliis regibus saepe laudetur. Frugi hominem dici non multum, ita vos, et ut verum fatear, ego quoque arbitramur, regi gratulamur. Fortem, iustum, gravem, magnificum, liberalem, mitem, munificum, fidelem volumus: haec sibi regia tuetur virtus, haec accipiat: ego, ut dixi, modestiae temperantiaeque, quae sunt frugalitatis, maximum in rege tribuo* (trans. WATTS [1931] adapted).

the fourth Stoic virtue of the Sage is only used in the *Tusculanae Disputationes* and disappears in Cicero's philosophical treatises thereafter.[59] Yet *frugalitas* does not replace *moderatio* or *temperantia*, both of which continue to be used in the later books of the *Tusculanae Disputationes*. *Modestia* seems to be preferred by Cicero and is carried over as a core concept into his later works such as *De Senectute* and *De Officiis*.[60] He therefore went to great lengths to establish a new meaning of a word, but often chose not to stick with it entirely or, if he did, it was frequently confined to the same work. We might see this as mere experimentation, an attempt, and then an admission of failure, at semantic augmentation. However, as we will discuss next, Cicero's use or disuse of his own terminology through the technique of synonymy could also be construed as a deliberate device, which might be described as a hermeneutical (i.e. an interpretative) method, designed to engineer an almost 360-degree view of the meaning of a given Greek technical term. In this case, fully capturing the subtle differences in meaning of σωφροσύνη as 'prudence' and 'soundness of mind' (*frugalitas* and *abstinentia*), moderation, and self-control (*modestia*, *moderatio*, *temperantia*):

Cicero would certainly not be the only philosopher to have been ambiguous about the precision and permanence of his technical vocabulary. We observe this phenomenon in Plato,[61] up to Enlightenment philosophers such as Kant, whose philosophical projects were far from 'desultory' (to use GLUCKER's term) and were, in fact, system-building, as KEMP SMITH noted: '[T]here is hardly a technical term which is not employed by [Kant] in a variety of different and conflicting senses. He is the least exact of all the great thinkers.'[62] In the example of *frugalitas* above, the new meaning given to the term to enhance its philosophical ambit in covering the 'fourth virtue' of the Stoic's Sage is conveyed by a multiple translation technique, with the terms *modestia*, *moderatio*, *abstinentia* and *temperantia* (see a diagram below).

A Latin reader's understanding of the Greek term from any one of the four chosen equivalents is, to use HABERMAS' phrase (1980, 183), 'unavoidably prepossessed' by the subject's given contexts within which he or she has initially acquired their interpretative schemes.[63] However, Cicero makes an effort to

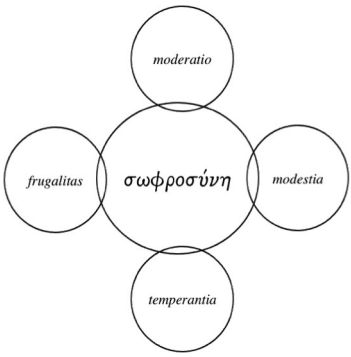
59 In the *Off.* for example, it is replaced with *de decorum*

60 Cf. also *Fin.* 2.60: *transferi de modestiam vel temperantiam ad moderationem rationi*: 'Apply the same test to Temperance or Moderation, which is the control of the appetites in obedience to the reason'. Here, *modestia* is used synonymously with *temperantia* linked via the technique of *figura etymologica* with *moderatio*.

61 E.g. in his inconsistent use of the difficult concepts of ἀίδιος, αἰώνιος, and οὐσία.

62 KEMP SMITH (1915), 527; see also PARFIT (2011), xlii.

63 For example, a Roman reader might be accustomed to approach *modestia* or *moderatio* through the lens of the *mos maiorum* instead of from a specifically Stoic or Academic one.



avoid sole reliance on the established senses, making sure to imbue at least one of them with the new semantic range of the Greek term (in this case *frugalitas*). This is not an isolated case, as can be in the uses of *comparo* and *aptrio opportuna* in *Tim.* 13, *moderatio* and *modestia* in the same work at section 23, and his translation of κατάληψις with the established *cognitio* and *perceptio* alongside the calque of *comprehensio* in *Fin.* 3.21.[64] The interpretative process here demonstrates a certain relationality between the terms Cicero uses to convey the 'whole' sense of the original Greek. *Frugalitas*, *moderatio*, *modestia*, and *temperantia* are not one-to-one equivalences of the Greek but, in their individual parts, each overlaps the whole meaning of σωφροσύνη.

3.3 *Notio, Notitia*

We discussed in Chapter 1 that Lucretius likely understood the philosophical terms of πρόληψις and ἔννοια through the Latin terms *notae* and *notitiae*. As in the previous example of σωφροσύνη, Cicero uses synonymy here once again, each synonym a lexical innovation of a different kind (sc. derivations or semantic extensions) to capture the senses of the Greek words. He uses *notitia* to gloss both terms in *Luc.* 30, then *notio* to gloss both again in the *Topica* 31. In the *De Natura Deorum* he uses *anticipatio* (1.43, 44–45) to *informare* translate Epicurus' notion of πρόληψις:

> *quae est enim gens aut quod genus hominum quod non habeat deorum anticipationem quam πρόληψιν Epicurus dicit eorum- dem rursus, id est antecepta animo rei quandam informationem sine qua nec intellegi quicquam nec quaeri nec disputari*

64 There are many other such examples, discussed further in the selective commentary on the *Tim.* below, but cf. also the lists in FISCHER (1914), 105–114 and GLUCKER (2012).

> For what nation or what tribe of men is there but possesses untaught some "preconception" of the gods? Which Epicurus terms πρόληψις, that is, a sort of preconceived mental picture of a thing, without which nothing can be understood or investigated or discussed.[65]

Other terms also appear in the same work, such as *conformatio*, *prius cognitum* and *praesensio*, which, although not glossing any Greek term in particular, reference the notions of πρόληψις and ἔννοια.[66] Each term is a semantic extension of existing Latin nouns.[67] REILEY makes the case that all of these terms seem to refer to both Greek words 'with no practical distinction'. It seems πρόληψις might be etymologically closer to *anticipatio*, and perhaps *notio* and ἔννοια to *conformatio*, *notio*.[68] But this is not to the detriment of the translation. REID observed that the Stoics distinguished between the two Greek terms, but they never attempted to point out which were always defined as strictly πρόληψις or ἔννοια.[69] That Lucretius and Cicero conflated the two terms, or used them interchangeably, might simply be a reflection of the current usage of the terms among their contemporary philosophical schools (see e.g. *Luc.* 30).[70] The main pattern to notice here is not whether each term used by Cicero in a given context was to map on exactly to either Greek expression, but rather the extensive *varietas* of terms, each synonymous in some way with the other, provided a hermeneutical approach to the transferral of the Greek concept into a Latin setting. There was no strict one-to-one equivalence or consistent use of a technical vocabulary in Cicero's works for either πρόληψις or ἔννοια, but this was not through a lapse in concentration or a slip of memory. It was rather a deliberate technique almost to encircle the Greek meaning from as many different semantic dimensions as possible for the reader's benefit without being tied to a single term or forced to create a new term *ex nihilo*

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65 Trans. RACKHAM (1993/2005), adapted.

66 See the recent discussion in MASO (2022), 143.

67 Cf. discussion in LINDERBAUER (1892–1893), 37.

68 REILEY (1909), 19. See also DYSON (2009), 156–157 for a survey of Latin equivalents to πρόληψις and ἔννοια in Cicero and Seneca. Note also Calcidius' unusual choice of *recognitio* translating ἔννοια (*Tim.* 247a) and διανοία (*Comm.* 342; cf. Pl. *Re.* 534a), discussed in Chapter 5.

69 REID (1885), 213. The Epicureans too seem not to be strict with any distinction between the two terms, see for example D.L. 10.33.

70 Cf. also later in Boeth.'s *In Top.* 1.3 (p. 332.6–15 Cl.). Compare also the discussion in Chapter 3 on *veri* and *probabile*

3.4 *Officium: Roman (and Stoic) Virtue*

In the *De Of.*, Cicero begins his introduction, addressed to his son, to the philosophical concept of 'duty' by providing himself the following licence (*Of.* 1.6): *sequemur igitur hoc quidem tempore et Stoicos non ut interpretes, sed, ut solemus, utemurque nostro, quantum quoque videbitur, iudicio et, cum placebit, non interpretabimur solum sed etiam quae videbuntur corrigemus* 'So I will, at this time and in this investigation follow chiefly the Stoics, not as a translator, but, as is my custom, I shall, at my own choice and discretion, draw from those sources in such measure and in such manner as shall suit my purpose.' In this declaration, we find Cicero self-aware—as he was in the *De Fin.* 1.6—*vis* of the difference between an *interpres* and, in a sense, an 'author': the first being a middleman or translator[71] and the latter drawing upon sources for his own purposes and using *iudicium*.[72] This is an important interpretative signal as to how Cicero will approach the concept of duty in his adaptation of Stoic writing on the subject. His philosophical (ethical) occupation with duty in the *De Of.* becomes ties to or harmonizes with the Romans' conception of duty in politics, religion, and interpersonal relations.[73] This observation suggests Cicero's interpretation of, for instance, Panaetius and other Stoic authors, was pre-conditioned by the values and virtues of his own cultural environment. Dyck saw no great gulf between the Greek and Cicero's *officium* but argued the difficulty was in the technical content of the Stoics' καθῆκον.[74] This sense, Dyck argues (1996/1999, 7), was 'directed toward fulfilling the rational nature of the human being, with *officium* made equivalent by Ciceronian fiat in this sense'. To view this in more context, we may observe the section of the *De Of.*, in which Cicero confronts the Stoic distinction between 'absolute' duties and 'mean' duties (*Of.* 1.8): *atque etiam alia officii genera sunt. nam et medium quoddam officium commune arbitror, quod κατόρθωμα, rectum autem, quod proprium officium, καθῆκον nominant* 'And yet there is still another [Stoic] classification of duties: one distinguishes between a "mean" duty (*officium commune*), so-called, and "absolute" duty (*officium*). Absolute duty we may, I presume, call "right," for the Greeks call it κατόρθωμα, while the ordinary (*communem*) duty they call καθῆκον.'

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71 See e.g. Powell (1995), 278.

72 Cf. Barnes (1985), 230–232, who suggests more weight ought to be given to Cicero's comments about his using his own judgement in the interpretation of Greek philosophy.

73 Walde (2003), 406.

74 Cf. the recent brief discussion in Maso (2022), 127–128, who suggests Cicero's *officium* was used in more practical-operational, rather than moral-theoretical, contexts.

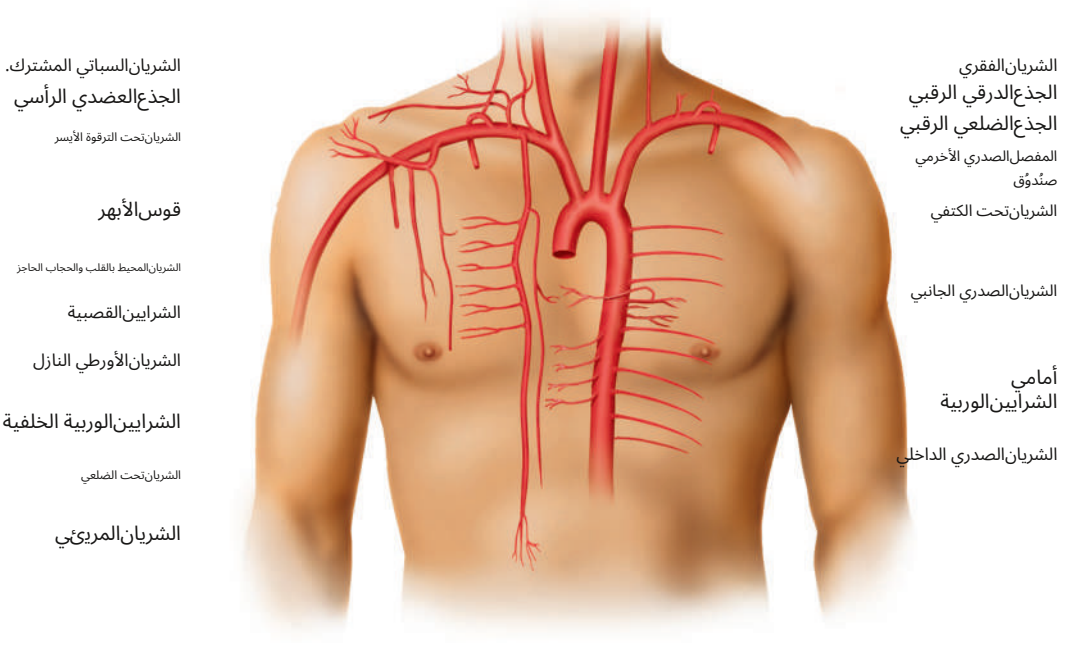
The general Stoic 'triplex' of duties has been summarized by various scholars and needs only a basic summary here. It involved 'duty' (καθῆκον) subdivided into 'correct' acts (κατορθώματα), 'middle' acts (μέσαι), and mistaken or 'false' acts (ἁμαρτήματα).[75] The first sub-category refers to correct acts performed by the Stoic 'sage', the wise person who acts for the right reasons, and whose actions are directed towards moral goods (ἀγαθά). However, in Cicero's classification, instead, we see the dichotomy of the overarching καθῆκον versus a subdivision thereof: the κατορθώματα, so he says in *De Officiis* 1.7: *omnis de officii quaestio in duplex* 'in every thing, concerning duty, the question is twofold'. Dyck holds that such a distinction has been 'grafted on' to the Stoic formulation, for a specific reason: to make the discussion more practical than theoretical. He suggests that, unlike in the discussion found in the *De Finibus* 3.58–59, Cicero's aim in the *De Officiis* treatise is one of practical ethics—a kind of ethic that was distinctly Roman. Certainly, the section of the third book in the *De Finibus* where the Stoic concept of duties or appropriate acts is discussed is put into an exposition format by Cicero's Stoic character M. Porcius Cato. This is a different context from the *De Officiis*, where Cicero himself had already warned his readers that he would not act as a mere *interpres* but to use his own judgement and select his Greek sources for his own purposes. Dyck is correct, then, that there is a palpable difference between Cato's exposition of duties in the *De Finibus* and Cicero's in the *De Officiis*, but we can further his point by suggesting that Cicero's agenda in the *De Officiis* was quite different. He was no longer simply recapitulating Stoic ideology; rather, he sought to transfer and adapt it through the lens of Roman customs and value systems. The notion of applying *iudicio* to his source material, therefore, becomes tied to a kind of cultural adaptation, in addition to a linguistic one. We might argue that Cicero's translation approach cannot be separated from his conceptual or cultural aims. He will give the basic, if somewhat conflated, definition of καθῆκον to his readers, but he is no longer interested in quibbling over sub-definitions, as he was in the *De Finibus*, but to use the term as a springboard from which he can outline his understanding of *officia* as a Roman citizen. As he cautions in the *De Officiis* 1.19 when discussing the virtue of knowledge: 'The other error is because some people devote too much study and effort to matters that are obscure and difficult and useless as well' (*alterum est vitium, quod quidam studium multamque operam in res obscuras aque non necessarias*).

75 See e.g. Pohlenz (1949), 1.129–131; von Arnim (1964), 3.491–493; Hossenfelder (2000), 704.

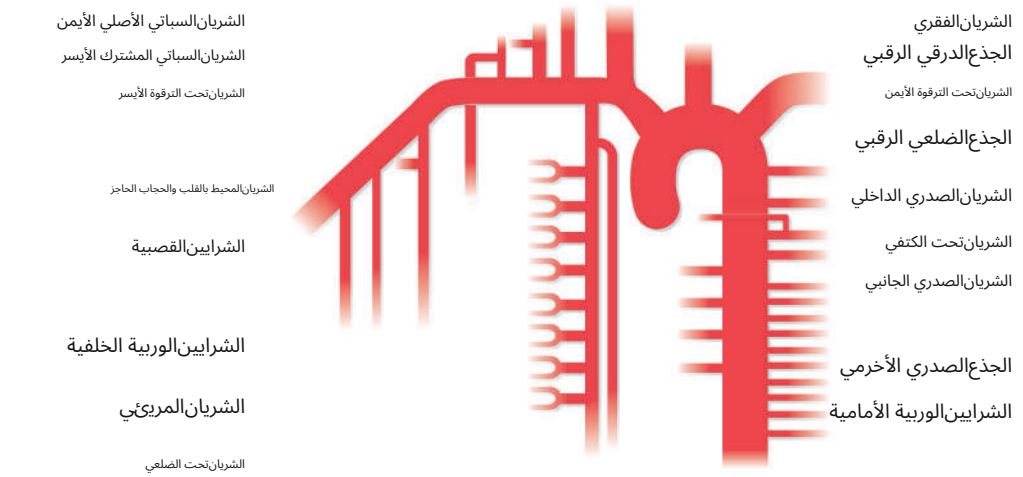
Part of Cicero's discussion of duty as a Roman and his choice of a certain Latin term to render the Greek will, by necessity therefore, involve the concepts inherent within the Roman social and legal institutions of his time. A glance at the *TLL*'s article for *officium* indicates its use as a term in all kinds of cultural contexts, from private (9.2.519.25), public (9.2.520.78), religious (9.2.521.20), professional and administrative (9.2.521.70) and legal (9.2.524.56), among others. The *TLL* shows that Cicero's use of *officium* cuts across each of these meanings. It is, then, not straightforward to separate Cicero's use of *officium* in the *De Finibus* or the *De Officiis* as a technical or novel meaning of the common Latin noun. Rather, his use of such an established word is itself an insight into his method of *inter*-cultural communication. Cicero comes to the 'first source of duty' in the *De Officiis* (1.20) (*de ipsis primo quid*): justice, which he in turn says is 'the crowning glory of virtues' (*virtutis est*). In discussing *ius* throughout the *De Officiis*, he has regular recourse to examples of Roman property law and uses these as moral authorities for the duties to be observed by citizens. COLISH (1990, 145) has suggested that the criteria that govern the duties relating to justice are 'non-philosophical ones; *they are Roman legal and*' (emphasis added). This is also in line with Cicero's understanding of *honestum*, which in the work is related to personal and public propriety, how one acts in daily life, not as a sage or *sapiens* but as a functioning member of civil society (*Off.* 1.17): 'If we bring a certain amount of propriety and order into the transactions of daily life, we shall be conserving moral rectitude and moral dignity' (*iis enim rebus, quae tractantur in vita, honestate metitur*). So we might suggest that Cicero's conceptualization of καθῆκον, at least in the *De Officiis*, seems deliberately conflated or reduced in Latin into the singular frame of *officium*. To such an degree, in fact, that Atticus apparently had cautioned against its use as an equivalent (*Att.* 16.14.3):[76]

> *mihi non est dubium quin καθῆκον, unum sit officium' . . . dubitas quin etiam in re publica campi sulum officium, senatus officium, imperi officium sit? aut da melius*
>
> I don't feel any doubt that what the Greeks call καθῆκον is our "*officium*" . . . Why do you (Atticus) doubt that it would apply perfectly well to pub-

76 See also the discussion in DYCK (1996/1999), 6–7.



(أ) **الشرايين الرئيسية**



(ب) **مخطط تدفق الدم**

الشكل20.32شرايين الصدر.(أ) الشرايين الصدرية الرئيسية. ب) مخطط تدفق الدم في الشرايين الصدرية.

20.7هـأوردة الصدر

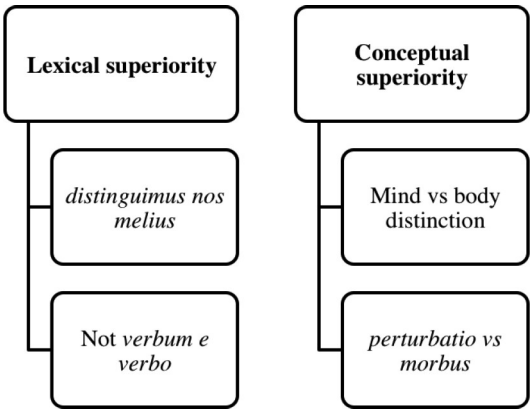
يستقبلالوريد الأجوف العلوي جميع التصريف الوريدي ليس فقط من الرأسوالرقبة كما سبق وصفه، ولكن أيضاً من جميع أعضاء وأنسجة الصدر.

روافدالوريد الأجوف العلوي

تحملالأوردة الأكثر بروزاً في الجزء العلوي من الصدر الدم من منطقة الكتفإلى القلب(**الشكل 20.33**)؛وهي كالتالي:

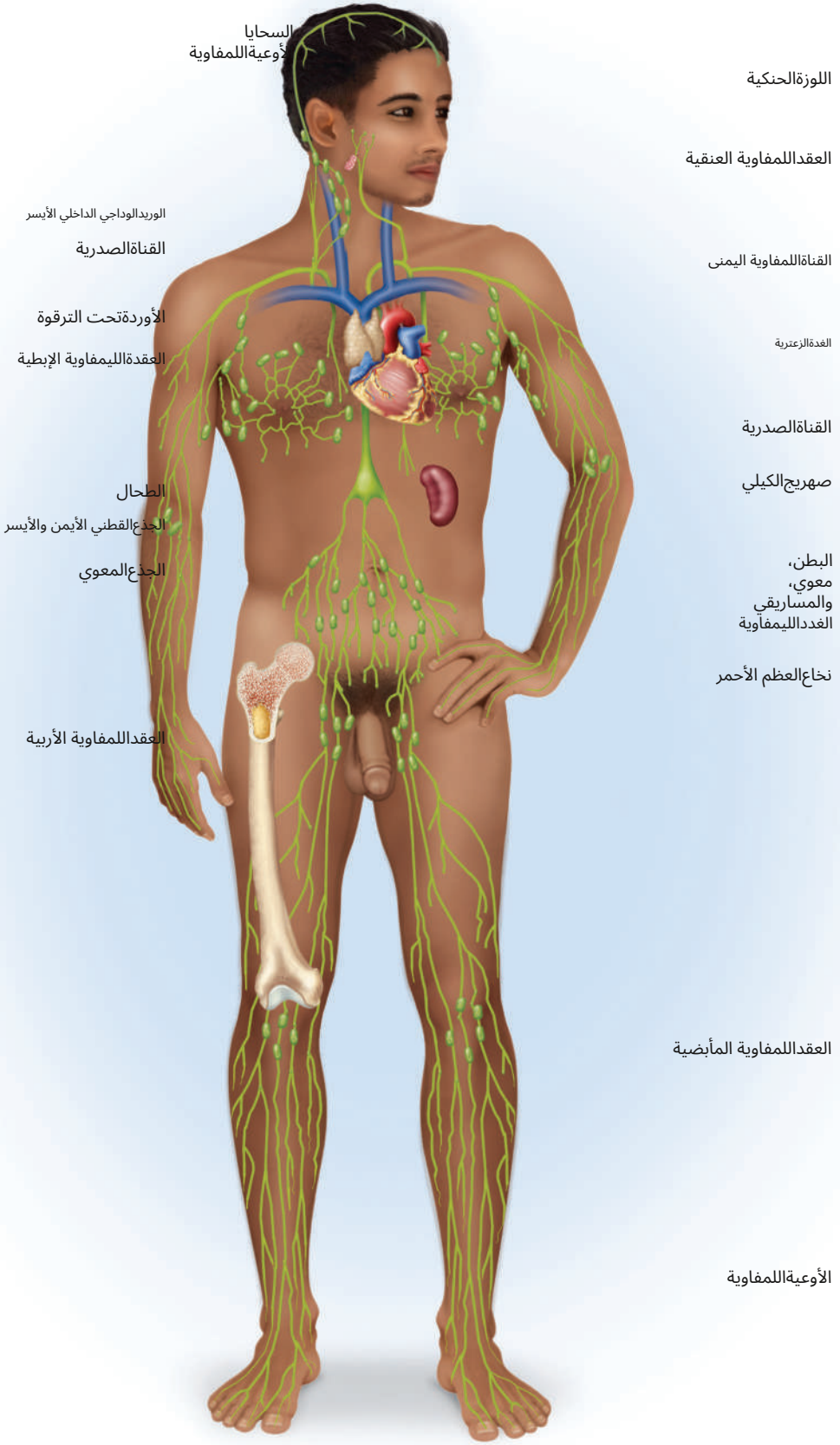
1.الـ**الوريد تحت الترقوة**يصُرف الدم من الطرف العلوي (انظر " الأوردةالعميقة" في القسم 20.8ب). يبدأ من الحافة الجانبية للضلعالأول ويمر خلف الترقوة. يستقبل الوريد الوداجي الخارجي والوريدالفقري، ثم ينتهي (يتغير اسمه) عند استقباله الوريد الوداجيالداخلي.

2.الـ**الوريد العضدي الرأسي**يتكون من اتحاد الوريد تحت الترقوة والوريد الوداجيالداخلي. يبلغ طول الوريد العضدي الرأسي الأيمن حوالي 2.5 سم فقط،بينما يبلغ طول الوريد العضدي الرأسي الأيسر حوالي 6 سم.



There is a section from Book 3 of the *Tusculanae*,[77] where the narrator 'M.'—apparently representing Cicero's blend of Stoic and New Academy views—addresses a claim by an interlocutor 'A.' that the *sapiens* is susceptible to grief (*aegror* or λύπη). 'M.' outlines the Stoic taxonomy of four classes of πάθη (irrational emotions): φόβος, ἡδονή, ἐπιθυμία (and later λύπη) as passions or 'perturbations' that the *sapiens* understands how to avoid. However, if λύπη is properly a physical affliction, the others cannot be classified under the same genus: 'M: Surely not of the remaining disorders (*perturbationes*) of the Soul too, terrors, lusts, fits of anger? These belong, speaking generally, to those which the Greeks call πάθη.' As we will see below, M. later considers grief (*aegritudo*) as resembling a 'disease' because of its physical manifestations in the human body, but ἐπιθυμία, φόβος, λύπη, ἡδονή cannot be seen as equivalent. He goes on: 'I might have called them "diseases" (*morbos*) and this would be a word-for-word rendering, but it would not fall within our usual usage (*consuetudinem nostri*).' Immediately, M. sees some distinction between the physical afflictions of the body and the perturbances of the Soul, and a literal rendering of the Greek term would produce a conflation rather than the necessary distinction: 'For pity, envy, exultation, joy, all these the Greeks term *morbos*, but these *movements* of the Soul (*motus*) are not to be heedless of reason. We, on the other hand, should—I think—rightly say that these same movements of an agitated

77 *Tusc.* 3.7: *num reliquae quoque, perturbationes animi, ludificationes, aegritudines, invidentiae, cupiditates, iracundiae, metus, misericordiae, gaudia, voluptates, morbos appellem? haec enim fere, quos audio Graecos, πάθη dicere, quae sint eorum genera, dixisti. sed de hac consuetudine nostri, si recte, si secus, alias; illa autem omnia morbos, ut Graeci, quae opinantur recte fieri, ita non recte, motus animi adversos et a recta ratione aversos, non item censeo; quae autem non sint, ea recte fieri videtur*



الشكل21.1 **الجهازاللمفاوي.**

fine instinct, in giving the name of "grief" (*aegri*) to vexation, anxiety, and anguish, by the analogy with human bodies that are ill.' The 'countrymen' M. refers to are the famous Latin playwrights and poets such as Plautus, Terence, and Pacuvius (see e.g. *TLL* 11.1.952.63–83) and thus the literary pedigree of the term ought not to be impeached. It is convenient for the narrator then, to take the side of these Roman literary authorities, who saw grief as a physical affliction (*aegi*) and/or to denigrate the Greek philosophers when it came to classifying φόβος, ἡδονή, and ἐπιθυμία (*Tusc.* 3.23):

> *hoc prope modum verbo Graeci omnem eam vocant* πάθος, *id nos morbum, quum id cum quo est motus in nos; aliquid sic enim in corporibus; ut timor in animo, cum similis aegritudini sit, sed ea recentibus malis, haec inveteratis, ut libido, quae non est similis morbo, sed ut cupiditas, quae est in animi elatione et gestiens*
>
> With almost the same term, the Greeks describe all disturbances of the Soul, for they use πάθος; that is, "disease" (*morbus*), for us any troubled movement in the Soul whatsoever. Our usage is better, for grief of the Soul closely resembles the condition of bodies out of health, but lust does not resemble sickness, nor does intemperate joy, which is an excited and exuberant pleasure of the Soul.

It is the superiority of Latin terminology, for M., which allows the subtler distinction between a 'diseased' mind and one perturbed by irrational passions. The verb *pertu* and its derivatives are found extensively—and almost exclusively—within Cicero's rhetorical and philosophical works and his preference for the imagery it conjures cannot be ignored in understanding why he prefers *pertu* to *morbo* or *aegri* in these sections.[81]

Whereas *aegri* is appropriate because it is the emotion closest to physical distress (and hence *morbi* might be a useful correlate with it), other irrational emotions such as *libido* and *immoderata laetitia*, for M., are not physical in nature and so require better labels. In these sections, we see the rhetorician at work, this time denigrating the Greek terminology in favour of Roman conceptions of emotions, although the reality is that Cicero is imbuing (probably) existing terms such as *pertu* with a novel philosophical sense: 'perturbation of the Soul' (*perturbo*). The fact that the *vitia* are equivalent to *o*

81 The *TLL* shows derivatives such as *pertu, perturbatio*, and *perturbatrix* are all first attested in Cicero (except *pertu*, which also appears in the anonymous *Rhet.*, *Her.*, see s.v., 10.1.1825.32).

2.أربعة أزواج من**الأوردة القطنية**تصب في الوريد الأجوف السفلي وكذلكفي الأوردة القطنية الصاعدة الموصوفة في القسم التالي.

3.ال**الأوردة التناسلية - الأوردة المبيضية**من الإناث و **الأوردة الخصوية**بالنسبة للذكور، تصُرف هذه الأوعية الدموية من الغدد التناسلية.ومثل الشرايين التناسلية، وللسبب نفسه، فهي أوعية طويلةورفيعة تنتهي بعيداً عن منشئها. يصب الوريد التناسلي الأيسرفي الوريد الكلوي الأيسر، بينما يصب الوريد التناسلي الأيمنمباشرة في الوريد الأجوف السفلي.

4.ال**الأوردة الكلوية**تصُرفّ الكليتان الدم إلى الوريد الأجوف السفلي. كما يستقبلالوريد الكلوي الأيسر الدم من الوريد التناسلي الأيسر والأوردة فوقالكلوية اليسرى. ويبلغ طوله ثلاثة أضعاف طول الوريد الكلوي الأيمن،لأن الوريد الأجوف السفلي يقع على يمين خط منتصف الجسم.

5.ال**الأوردة فوق الكلوية**تصرف الغدد الكظرية (فوق الكلوية). تصب الغدة فوقالكلوية اليمنى مباشرة في الوريد الأجوف السفلي، بينما تصب الغدة فوقالكلوية اليسرى في الوريد الكلوي الأيسر.

6.ال**الأوردة الحجابية السفلية**تصريف الجزء السفلي من الحجاب الحاجز.

7.ثلاثة**الأوردة الكبدية**تصريف الكبد، مع امتداد مسافة قصيرة من سطحهالعلوي إلى الوريد الأجوف السفلي.

بعدتلقي هذه المدخلات، يخترق الوريد الأجوف السفلي الحجاب الحاجز ويدخلالأذين الأيمن للقلب من الأسفل (انظر الشكل 19.5). ولا يتلقى أي تصريفدموي من الصدر.

أوردةجدار البطن

زوجمن**الأوردة القطنية الصاعدة**يستقبل هذا الوريد الدم من الأوردة الحرقفيةالمشتركة في الأسفل ومن الأوردة القطنية المذكورة سابقاً في الجدارالخلفي للجسم (انظر الشكل 20.33ب). تتفرع الأوردة القطنية الصاعدةإلى الوريد الأجوف السفلي المجاور لها، مشُكلةً فروعاً وعائيةً أثناءصعودها إلى الحجاب الحاجز. يمر الوريد القطني الصاعد الأيسر عبر الحجابالحاجز من خلال الفتحة الأبهرية، ويستمر في مساره كوريد نصف فرديفي الأعلى. أما الوريد القطني الصاعد الأيمن، فيمر عبر الحجاب الحاجزإلى يمين العمود الفقري، ويستمر في مساره كوريد فردي. وقد وصُفتالمسارات اللاحقة للوريدين الفردي ونصف الفردي سابقاً.

الجهازالبابي الكبدي

ال**أنظمة البوابة الكبدية**يستقبل كل الدم المتدفق من الجهاز الهضمي البطني،وكذلك من البنكرياس والمرارة والطحال(**الشكل 20.38**).كما هو الحالفي أنظمة الدورة الدموية البابية الأخرى، يمر الدم عبر شبكتين من الشعيراتالدموية على التوالي في دورة واحدة حول الدورة الدموية الجهازية.تقع الشبكة الأولى من الشعيرات الدموية في هذه الحالة في الأمعاءوأعضاء الجهاز الهضمي الأخرى؛ أما الثانية فهي شبكة من الشعيراتالدموية المعدلة في الكبد تسمى...*الجيوب الكبدية*((انظر الشكل20.6). يكون دم الأمعاء غنياً بالعناصر الغذائية لبضع ساعات بعد تناولالطعام. يزود الجهاز البابي الكبدي الكبد أولاً.

تستحوذهذه العناصر الغذائية على الكبد قبل توزيعها على باقي أجزاء الجسم.كما يسمح للكبد بتنقية الدم من البكتيريا والسموم التي يمتصها منالأمعاء، وهي وظيفة حيوية للكبد. وفيما يلي الأوردة الرئيسية للجهاز البابيالكبدي:

1.الـ**الوريد المساريقي السفلي**يستقبل الدم من المستقيم والقولون البعيد.ويتجمع في شكل مروحة في المساريق ويصب في الوريد الطحالي.

2.الـ**الوريد المساريقي العلوي**يستقبل الدم من الأمعاء الدقيقة بأكملها،والقولون الصاعد، والقولون المستعرض، والمعدة. كما أنه يظهرترتيباً يشبه المروحة في المساريق، ثم ينضم إلى الوريد الطحاليليشكل الوريد البابي الكبدي.

3.ال**الوريد الطحالي**يفُرغ الطحال ويمر عبر الجزء العلوي من تجويف البطنباتجاه الكبد. وفي طريقه، يلتقط**الأوردة البنكرياسية**من البنكرياس،ثم يلتقط الوريد المساريقي السفلي، وينتهي عند نقطة التقائهبالوريد المساريقي العلوي.

4.ال**الوريد البابي الكبدي**وهو امتداد لما بعد التقاء الوريد الطحالي والوريدالمساريقي العلوي. ويمتد حوالي 8 سم إلى الأعلى وإلى اليمين،ويستقبل**الوريد الكيسي**ينطلق الدم من المرارة، ثم يدخل السطحالسفلي للكبد. وفي الكبد، يصب في النهاية في الجيوب الكبديةالمجهرية التي لا تحُصى. يتجمع الدم من هذه الجيوب في الأوردةالكبدية، التي تصب بدورها في الوريد الأجوف السفلي. يشُرح دورانالدم داخل الكبد بمزيد من التفصيل في القسم 25.4أ.

5.اليسار واليمين**الأوردة المعدية**تشكل قوساً على طول الانحناء الأصغرللمعدة وتصب في الوريد البابي الكبدي.

قبلأن تتابع

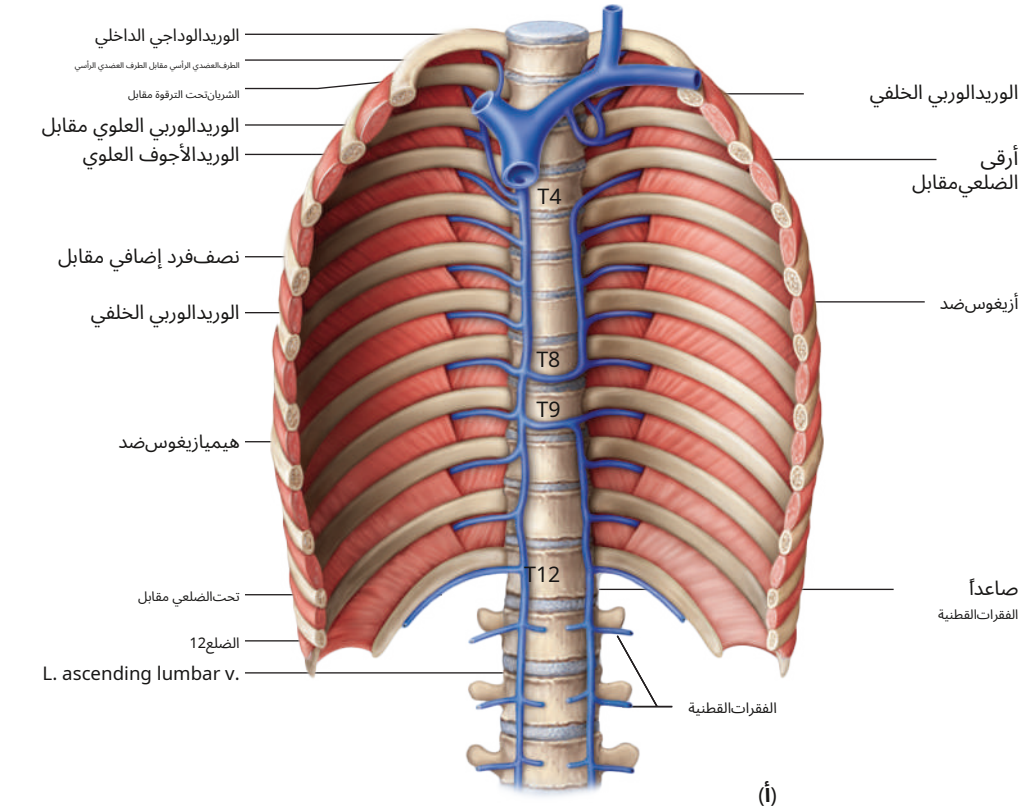
أجبعن الأسئلة التالية لاختبار فهمك للقسم السابق:

26.قارن بإيجاز بين وجهات الشرايين السباتية الخارجية والداخلية.

27.اذكر بإيجاز الأعضاء أو أجزاء الأعضاء التي يتم تزويدها بالدم عن طريق (أ) الدائرةالشريانية الدماغية، (ب) الجذع البطني، (ج) الشريان المساريقيالعلوي، و (د) الشريان الحرقفي الداخلي.

28.إذا كنت تقوم بتشريح جثة، فأين ستبحث عن الوريد الوداجي الداخلي والخارجي؟وما العضلة التي ستساعدك على التمييز بينهما؟

29.تتبع مسار خلية الدم من جدار الجسم القطني الأيسر إلى الوريد الأجوف العلوي،مع تسمية الأوعية التي ستمر من خلالها.



الشكل20.33 التصريفالوريدي لـ الجدارالخلفي للصدر والبطن.(أ) نظام الوريد الفردي لجدار الصدر. يوفر هذا النظام تصريفاً وريدياًمن جدار وأحشاء الصدر، ولكن لم يتم توضيحالروافد الحشوية.

(ب) رسم تخطيطي لتدفق الدم في التصريف الصدريوالبطني. تشكل المكونات الموجودة فوقالحجاب الحاجز الجهاز الوريدي الفردي. ويوجدتباين كبير بين الأفراد في هذا التشريح.

the mind or Soul. The salient fact is that Cicero can now use his philosophical terminology to his advantage, undertaking a worthy cause for his fellow countrymen (*Ac* 2.3–6) in marshalling the resources of Latin and adding to its semantic range, outdoing Greek philosophy by an increased nuance in meaning that directly reflects Cicero's Academic-Stoic blend of philosophy, especially in the *Tusculanae*. He is unperturbed to use or coin terms that escape the charge of excessive novelty or strangeness by avoiding *verbum* renderings even though he does provide them to the reader and *mores* as a well-established term in Latin in any case (arguably more standard than the abstract *perturbat*) and by appealing to the authority of earlier Latin authors and even to Roman legal definitions. It is not that *mores* is 'ungewohnt' because it was *verbum*, as Ebert argued based on Cicero's purported justifications, but rather because it is, in the opinion of the character of M.—and probably Cicero himself—*conceptually* inadequate as a description of the genus of irrational emotions under discussion. This is because it is *too* close a translation of the Greek term (πάθος), which itself is—as with μελαγχολία—conceptually inadequate.

3.6 *Translation Problems: ἐτυμολογία and εἶδος*

Stylistic preferences, as well as conceptual and metatextual ones, also influenced his decision to settle on a specific term. Two examples illustrate this neatly from the later work of the *Top.* As discussed in the Introduction, although the *Top.* is a kind of rhetorical handbook, unlike other more exclusively rhetorical works such as *De Inv.*, it summarizes, and sometimes renovates, Aristotle's philosophy of *topoi* 'topics, commonplaces', which makes it an important work to include in this study. In *Top.* 30, he attempts to translate the notion of the Platonic εἶδος 'form':

> *in divisione formae appellatae a Graecis, quas ipsi partes vocant, species appellant, non pessime id casus in dicendo. nolim enim, ne si Latine et speciebus dicere, et saepe his casibus velim. cum autem utroque verbo indifferenter dicendo non arbitror neglegendam*
>
> In a division, there are species that the Greeks call εἴδη, while our writers, if any of them happens to talk about this matter at all, call them *species*, which is not bad, but awkward for inflection when you speak. I would rather not, even if it were possible in Latin, say *speci* and *speciebus* and there is often reason to use these cases; but I should like to say *formis*

يذاكر مرشد

2.كيف ينظم الدماغ تدفق الدم فيه، وما هو المحفز الكيميائيالأقوى في تنشيط آلياته التنظيمية؟

3.أسباب وآثار واختلاف النوبة الإقفارية العابرة (TIA) والحادثالوعائي الدماغي (السكتة الدماغية)

4.تباين تروية العضلات الهيكلية؛ ما هي المحفزات التيتزيد التروية لتلبية متطلبات التمرين؛ ولماذا يسببالانقباض متساوي القياس التعب بشكل أسرعمن الانقباض متساوي التوتر

5.كيف تختلف الدورة الدموية الرئوية عن الدورة الدمويةالجهازية فيما يتعلق بضغط الدم، وتبادلالدم في الشعيرات الدموية، والأكسجة النسبيةللدم الشرياني والوريدي، والاستجابة الوعائيةالحركية لنقص الأكسجة

20.6تشريح الدورة الدموية الرئوية

1.مسار تدفق الدم في الدورة الدموية الرئوية

2.أين توجد الشعيرات الدموية في الدورة الدموية الرئويةووظيفتها؟

3.كيف تختلف وظيفة الدورة الدموية الرئوية عن وظيفةالشرايين القصبية التي تغذي الرئتين أيضاً؟

20.7الأوعية الدموية الجهازية في المنطقة المحورية

1.بالنسبة لجميع الأوعية الدموية المذكورة في هذا المخطط،يجب تحديد موقعها التشريحي؛ والوعاء الذيتنشأ منه؛ والمسار الذي تسلكه؛ والأعضاء أو مناطقالجسم أو الأوعية الدموية الأخرى التي تغذيها.

2.الشريان الأورطي الصاعد، وقوس الأبهر، والشريانالأورطي النازل، والأجزاء الصدرية والبطنيةمن الشريان الأورطي النازل (القسم 20.7أ)

3.الفروع التي تنشأ من الأبهر الصاعد وقوس الأبهر: الشرايينالتاجية، والجذع العضدي الرأسي، والشريانالسباتي الأصلي الأيسر، والشريان تحت الترقوةالأيسر (القسم 20.7أ).

4.أربعة شرايين رئيسية في الرقبة: الشريان السباتي المشترك،والشريان الفقري، والجذع الدرقي الرقبي، والجذعالضلعي الرقبي (القسم 20.7ب)

5.الشرايين السباتية الخارجية والداخلية؛ فروع الشريان السباتيالخارجي (الشريان الدرقي العلوي، والشريان اللساني،والشريان الوجهي، والشريان القذالي، والشريان الفكيالعلوي، والشريان الصدغي السطحي)؛ وفروع الشريانالسباتي الداخلي (الشريان العيني، والشريان المخيالأمامي، والشريان المخي الأوسط) (القسم 20.7ب)

6.تقارب الشرايين الفقرية لتشكيل الشريان القاعدي؛ الشرايينالمخية الخلفية والشرايين المؤدية إلى المخيخوالجسر والأذن الداخلية الناشئة من الشريانالقاعدي (القسم 20.7ب)

7.موقع ومكونات الدائرة الشريانية الدماغية (القسم 20.7ب)

8.الجيوب الوريدية الجافية؛ الجيوب السهمية العلويةوالسفلية والمستعرضة والكهفية؛ التدفق الخارجمن نظام الجيوب إلى الأوردة الوداجية الداخلية(القسم 20.7 ج)

9.الأوردة الوداجية الداخلية، والأوردة الوداجية الخارجية، والأوردةالفقرية في الرقبة (القسم 20.7 ج)

10.الفروع الحشوية (الشرايين القصبية والمريئية) والفروعالجدارية (الشرايين الوربية الخلفية، والشرايينتحت الضلعية، والشرايين الحجابية العلوية) للشريان الأورطي الصدري (القسم 20.7د)

11.شرايين الصدر والكتف التي تنشأ من الشريان تحتالترقوة وامتداده، الشريان الإبطي: الشريان الصدريالداخلي، الجذع الصدري الأخرمي، الجانبي

الشريانالصدري، والشريان تحت الكتف (القسم20.7د)

12.الوريد تحت الترقوة، والوريد العضدي الرأسي، والوريدالأجوف العلوي؛ معالم تحدد الانتقال من واحدإلى آخر (القسم 20.7هـ)

13.نظام الأوردة الصدرية الفردية، وخاصة الأوردة الفردية،ونصف الفردية، ونصف الفردية الإضافية؛ وروافدها،بما في ذلك الأوردة الوربية الخلفية، وتحتالوربية، والمريئية، والمنصفية، والتامورية، والشعبية،والقطنية الصاعدة (القسم 20.7هـ).

14.فروع الشريان الأورطي البطني: الشرايين الحجابية السفلية؛ الجذع البطني؛والشرايين المساريقية العلوية، والشرايين فوق الكلوية الوسطى،والشرايين الكلوية، والشرايين التناسلية (المبيضية أو الخصوية)، والشرايين المساريقية السفلية، والشرايين القطنية، والشرايينالعجزية الوسطى، والشرايين الحرقفية المشتركة (القسم20.7f).

15.المجموعة العامة من الأعضاء التي يغذيها الجذع البطني؛وفروعه الرئيسية الثلاثة - الشريان الكبدي المشترك،والشريان المعدي الأيسر، والشريان الطحالي- والفروع الأصغر التي تتفرع من كل منها (القسم20.7f).

16.فروع الشريان المساريقي العلوي: الشريان البنكرياسي الاثني عشريالسفلي، والشريان الصائمي، والشريان اللفائفي، والشريانالقولوني الأيمن والأوسط (القسم 20.7f)

17.فروع الشريان المساريقي السفلي: الشريان القولوني الأيسر،والشريان السيني، والشريان المستقيمي العلوي(القسم 20.7f)

18.فرعان رئيسيان للشريان الحرقفي الأصلي، والجذعان الخلفي والأمامي للشريان الحرقفي الداخلي،والأعضاء التي تغذيها تلك الجذوع (القسم20.7f).

19.التقاء الأوردة الحرقفية الداخلية والخارجية لتشكيلالوريد الحرقفي المشترك؛ التقاء الأوردةالحرقفية المشتركة اليمنى واليسرى لتشكيلالوريد الأجوف السفلي (IVC) (القسم g 20.7)

20.روافد الوريد الأجوف السفلي البطنية: القطنية، والتناسلية(المبيضية أو الخصوية)، والكلوية، الأوردةفوق الكلوية والكبدية والحجابية السفلية(القسم 20.7g)

21.الأوردة القطنية الصاعدة، وتصريفها في البطن، واستمرارهافي الصدر (القسم 20.7g)

22.الجهاز البابي الكبدي وفروعه: الوريد الطحالي؛ الأوردةالبنكرياسية والمساريقية السفلية والمساريقيةالعلوية التي تصب فيه؛ استمرار الوريدالطحالي كوريد بابي كبدي؛ الوريد الكيسي والأوردةالمعدية التي تصب في الوريد البابي الكبدي؛الجيوب الكبدية في الكبد؛ والأوردة الكبدية(القسم 20.7g).

20.8الأوعية الدموية الجهازية في منطقة الزائدة الدودية

1.الشريان الرئيسي للطرف العلوي، والذي يتغير اسمهعلى طول مساره من الشريان تحت الترقوة إلىالشريان الإبطي إلى الشريان العضدي؛ وفروع الشريانالعضدي في الذراع (الشريان العضدي العميقوالشريان الزندي العلوي الجانبي)؛ والشريانالكعبري الجانبي. (القسم 20.8أ)

2.فروع الشريان العضدي التي تغذي الساعد: الشرايينالكعبرية والزندية؛ الشرايين بين العظام الأماميةوالخلفية؛ والأقواس الراحية العميقة والسطحية(القسم 20.8أ)

3.الشبكة الوريدية الظهرية لليد؛ الوريد الساعدي المتوسط؛والوريد المرفقي المتوسط (القسم 20.8ب)

4.الأقواس الراحية الوريدية، والأوردة العضدية، والقاعدية،والإبطية، وتحت الترقوة (القسم 20.8ب)

5.استمرار الشريان الحرقفي الخارجي كشريان فخذي؛ الفروعالفخذية العميقة والفخذية المنعطفة للشريانالفخذي؛ الشريان المأبضي؛ والشرايين الظنبوبيةالأمامية والخلفية (القسم 20.8 ج)

6.الشرايين الظهرية للقدم والشرايين المقوسة التي تنشأ من الشريانالظنبوبي الأمامي؛ الشرايين الشظوية، والشرايين الأخمصيةالإنسية، والشرايين الأخمصية الوحشية؛ والقوس الأخمصيالعميق (القسم 20.8 ج)

7.القوس الوريدي الظهري السطحي، والأوردة الصافنة الصغيرةوالكبيرة، والوريد المأبضي (القسم 20.8د)

8.القوس الوريدي الأخمصي العميق؛ الأوردة الأخمصية الوحشيةوالوسطى؛ الأوردة الشظوية والظنبوبية الخلفية؛والأوردة الظنبوبية الأمامية (القسم 20.8د)

9.الأوردة الفخذية، والأوردة الفخذية العميقة، والأوردة الحرقفية الخارجية(القسم 20.8د)

lished form *n o t a* now with the new sense of 'etymology' (ἐτυμολογία).[88] However, *n o t a* kept the primary meaning of 'denotation' or 'designation' and Cicero preferred this because *s u n t v e r b a*. The Greek term, however, is not concerned with denotation alone but rather a particular type of meaning: the 'true or original meaning' via derivation (or by inverse derivation—a working backwards from what has been derived over time from the pristine meaning of the word), hence τὸ ἔτυμον from ἐτεός 'true sense of a word' (see LSJ s.v., II).[89] Cicero had used the character of Varro in his revised *A c a d e m i c a* book to explain the concept of ἐτυμολογία earlier, using a logical periphrasis to render the term in that context (*A c a d*. 32): *i d e s t , q u a d e c a u s a q u i t a n o m i n a t a s i n t*. Later in the *T o p*, Cicero prefers *n o t a* and, in doing so, sacrifices accuracy for style. However, exactly why Cicero discarded the more literal translation of ἐτυμολογία is a less interesting question than why he introduced it at all, given that he had already decided to discard it on account of a stylistic problem and if he had, as in the *A c a d e*, previously been content with paraphrasing it.

In the legal-rhetorical framework of Cicero's *T o p*, Reinhardt (2003, 211) observed that 'in the Republican era the jurists and the grammarians frequently had to interpret legal documents containing obscure words; this can [...] be done without a commitment to a particular linguistic theory.' Unlike, for example, Stoic philosophers, Roman jurists' pragmatic interest in meaning, 'which guided their etymological efforts, [was] in itself unlikely to derive from or to be informed by a coherent doctrine'. Cicero appeared similarly noncommittal and pragmatic when it came to construing denotation in a naturalist or conventionalist manner. He simply states that words are the *n o t a* ('tokens, designations') of things, which, he adds, Aristotle—a conventionalist—termed σύμβολα (*T o p* 35). He does not need to tie himself to a specific view of etymological derivation of meaning as the 'true' meaning and, indeed, as a lawyer and adherent of Academic Scepticism, he likely viewed etymology as having little to do with 'truth', but simply one of many types of methods of argumentation. So he concludes (*T o p* 35): 'But when one understands what is meant, it is less important to fuss over the name' (*s e d c u m i n t e l l e g a t u r , n i h i l i t u r s q u i*

88 Note that the word ἐτυμολογία is not attested in either Plato or Aristotle (see e.g. Aristotle's *T o*. *p*. 112a32–33: μεταφέροντα τοὔνομα ἐπὶ τὸν λόγον = 'to examine meaning by etymology') and is only found much later (see LSJ s.v., also Reid [1885], 138–139 who notes even the older Stoics did not use the term, but preferred ὀνομάτων ὀρθότης, which could in fact more closely serve as the source of Cicero's compounding calque *v e r i l o q u i u m*).

89 Cf. also Varro *L*. 5.5. For this difference in e.g. Cicero's discussions in the *T o*., see Reinhardt (2003), 208–210. For ancient theories of etymology in general, see Blank (1982), 21–23. See also Boethius *I n . T o p* 4, *p*. 3362–3f. *c*

يحدثهذا عندما تقف، حيث تسحب الجاذبية الدم إلى الأوردة الكبيرة في البطنوالأطراف السفلية، مما يقلل من عودة الدم الوريدي إلى القلب ونتاجالقلب إلى الدماغ. في الوضع الطبيعي، تستجيب مستقبلات الضغطبسرعة لهذا الانخفاض في الضغط وتستعيد تدفق الدم إلى الدماغ (انظر الشكل 1.8). مع ذلك، فإن منعكسات الضغط ليست فعالة في علاجارتفاع ضغط الدم المزمن. في غضون يومين أو أقل، تعُدلّ هذه المستقبلاتنقطة ضبطها لتتوافق مع ضغط الدم المرتفع وتحافظ على التوازنالديناميكي عند هذا المستوى الجديد.

أ**انعكاس كيميائي**هو استجابة لا إرادية للتغيرات في كيمياء الدم، وخاصةدرجة الحموضة وتركيزات الأكسجين2وشركاه2يتم بدء هذه العملية بواسطةالمستقبلات الكيميائية التي تسمى*الأجسام الأبهرية*و*أجسام الشريان السباتي*كما ذكُر سابقاً. يتمثل الدور الأساسي للمنعكسات الكيميائية في تعديلالتنفس وفقاً للتغيرات في كيمياء الدم، ولكن لها دور ثانوي في المنعكساتالوعائية. نقص الأكسجة (انخفاض نسبة الأكسجين في الدم)2 نقص)، فرط ثنائي أكسيد الكربون في الدم (CO2)2يؤدي فرط حموضة الدم (ارتفاعضغط الدم) والحماض (انخفاض درجة حموضة الدم) إلى تحفيز المستقبلاتالكيميائية، ويعملان عبر المركز الحركي الوعائي لإحداث تضيق وعائيواسع النطاق. وهذا بدوره يرفع ضغط الدم الكلي، مما يزيد من تدفق الدمإلى الرئتين ومعدل تبادل الغازات. كما تحفز المستقبلات الكيميائية عمليةالتنفس، لذا فإن زيادة تهوية الرئتين تتناسب مع زيادة تدفق الدم إليهما.أما زيادة أحدهما دون الآخر (تدفق الهواء دون تدفق الدم، أو العكس) فلنيكون لها فائدة تذكر.

ال**منعكس نقص التروية النخاعي**(.هو استجابة لا إرادية لانخفاض تدفقالدم إلى الدماغ)iss-KEE-mic(**الإسكيمية** نقص التروية الدماغية (إسكيميا) هو نقص في تدفق الدم إلى أي نسيج أو عضو. يراقب النخاع المستطيلإمداده الدموي، ويفُعلّ ردود فعل تصحيحية عند استشعاره نقصالتروية. في غضون ثوانٍ من انخفاض التروية، ترُسل المراكز القلبية والوعائيةالحركية في النخاع إشارات ودية إلى القلب والأوعية الدموية، ممايسُرعّ نبضات القلب ويضُيقّ الأوعية. ترفع هذه الإجراءات ضغط الدم، وتعُيد،في الوضع الأمثل، التروية الدماغية الطبيعية. كما تتلقى المراكز القلبيةوالوعائية الحركية إشارات من مراكز دماغية أخرى، لذا يمُكن أن يؤُديالتوتر والغضب والإثارة إلى ارتفاع ضغط الدم. يعمل الوطاء من خلالالمركز الوعائي الحركي لإعادة توجيه تدفق الدم استجابةً للتمارين الرياضيةأو تغيرات درجة حرارة الجسم.

التحكمالهرموني

تعُدّ الهرمونات وسيلة أخرى للتحكم عن بعُد في تدفق الدم. تؤثر جميع الهرموناتالتالية على ضغط الدم، بعضها من خلال تأثيراتها الوعائية، وبعضهاالآخر من خلال وسائل مثل تنظيم توازن الماء:

- **أنجيوتنسينII.**هذا مضُيقّ قوي للأوعية الدموية يرفع ضغط الدم. يوضحالشكل 23.15 تركيبه وآلية عمله. يتطلب تركيبه*إنزيم تحويل الأنجيوتنسين(ACE)*. غالباً ما يتم علاج ارتفاع ضغط الدم بأدوية تسمى*مثبطات الإنزيم المحول للأنجيوتنسين*،والتي تمنع عمل هذا الإنزيم،وبالتالي تخفض مستويات الأنجيوتنسين II وضغط الدم.

- **الألدوستيرون.**يعزز هذا "الهرمون المحتفظ بالملح" بشكل أساسي الصوديوم+احتباس الصوديوم في الكليتين. وبما أن الماء يتبع الصوديوم بالخاصيةالأسموزية، فإن الصوديوم+يعزز احتباس السوائل احتباس الماء، وبالتاليدعم ضغط الدم.
- **الببتيداتالمدرة للصوديوم.**تعمل هذه الهرمونات، التي يفرزها القلب،على تثبيط الألدوستيرون. وهي تزيد من الصوديوم.+إفراز عنطريق الكليتين، مما يقلل من حجم الدم وضغطه. كما أن لها تأثيراً موسعاً للأوعية الدموية بشكل عام، مما يساعد على خفض ضغط الدم.

- **هرمونمضاد لإدرار البول.**يعزز هرمون ADH في المقام الأول احتباسالماء، ولكنه عند التركيزات العالية المرضية يكون أيضاً مادة قابضةللأوعية الدموية - ومن هنا جاء اسمه البديل.*فازوبريسين الأرجينين*.كلا هذين التأثيرين يرفعان ضغط الدم.
- **الأدرينالينوالنورأدرينالين.**ترتبط هذه الكاتيكولامينات الكظرية والوديةبمستقبلات ألفا الأدرينالية الموجودة على العضلات الملساء لمعظمالأوعية الدموية. وهذا يحفز تضيق الأوعية الدموية ويرفع ضغطالدم.

ñ ñ ñ **طبقّما تعرفه**

مثبطاتالرينين هي أدوية تسُتخدم لعلاج ارتفاع ضغط الدم. اشرح كيفتعتقد أنها ستحُدث التأثير المطلوب.(تلميح: انظر*""الكليتان" فيالقسم 17.3h.*)

20.2دغرضان لحركة الأوعية الدموية

تؤديحركة الأوعية الدموية (انقباض الأوعية الدموية وتوسعها) غرضين فسيولوجيين:رفع أو خفض ضغط الدم بشكل عام في جميع أنحاء الجسم، وتعديلتروية عضو معين بشكل انتقائي وإعادة توجيه الدم من منطقة فيالجسم إلى أخرى.

يتطلبالارتفاع العام في ضغط الدم تحكماً مركزياً، إما من خلال عمل المركزالحركي الوعائي في النخاع المستطيل أو بواسطة هرمونات تنتشر فيجميع أنحاء الجسم، مثل أنجيوتنسين II أو إيبينفرين. يؤدي تضيق الأوعيةالدموية المنتشر إلى رفع ضغط الدم الكلي لأن الأوعية الدموية بأكملهاتضغط على كمية ثابتة من الدم، تماماً كما يرتفع ضغط الماء عند الضغطعلى زجاجة ماء بلاستيكية. قد يكون هذا مهماً لدعم التروية الدماغيةفي حالات مثل النزيف أو الجفاف، حيث ينخفض حجم الدم بشكلملحوظ. في المقابل، يؤدي توسع الأوعية الدموية العام إلى خفض ضغطالدم في جميع أنحاء الجسم.

يمكنتحقيق إعادة توجيه الدم وتغييرات في تروية الأعضاء الفردية إماعن طريق التحكم المركزي أو الموضعي. على سبيل المثال، أثناء ممارسةالرياضة، يمكن للجهاز العصبي الودي أن يقلل بشكل انتقائي منتدفق الدم إلى الكليتين والجهاز الهضمي. ومع ذلك، وكما رأينا سابقاً، فإنتراكم نواتج الأيض في نسيج ما يمكن أن يحفز توسع الأوعية الدموية الموضعيويزيد من تروية ذلك النسيج دون التأثير على الدورة الدموية في أيمكان آخر من الجسم.

إذاانقبض شريان معين، ينخفض الضغط في الجزء الواقع أسفل الانقباضويرتفع في الجزء الواقع قبله. وإذا كان بإمكان الدم أن يسلك أحد مسارين،وكان أحدهما أكثر مقاومة من الآخر، فإن معظم الدم يسلك المسارالأقل مقاومة. هذه الآلية تمُكنّ الجسم من إعادة توجيه الدم من عضوإلى آخر.

علىسبيل المثال، إذا كنت تغفو على كرسي بذراعين بعد تناول وجبة دسمة(**الشكل 20.17أ**)،يؤدي تضيق الأوعية الدموية إلى توقف تدفق الدمإلى 90% أو أكثر من الشعيرات الدموية في عضلات الأطراف السفلية (وعضلات أخرى في الجسم). وهذا يرفع ضغط الدم فوق الأطراف، حيث يتفرعمن الشريان الأورطي فرعٌ يسُمى الشريان المساريقي العلوي، الذي يغُذيالأمعاء الدقيقة. تتميز الدورة الدموية في الأطراف بمقاومة عالية، بينماتكون المقاومة منخفضة في الجزء العلوي من الجسم.

Cicero appears to have been the first in Latin to gloss the term σοφίσματα in his *Luculus*, where he writes (46): *ne abiis quae clara sint praestigiis quibus delectemur abducantur* ('lest we are distracted by trickeries and captious arguments from positions that are clear in themselves' and (75): *at qui habebam molestos, Stilbonem Diodorum Alexinum quorum sunt contorta et aculeata (sciuadentia enim appellant) fallacia* ('And I had (philosophers) who gave you some trouble, though they were insignificant: Stilbo, Diodorus, Alexinus, who had some twisted and cunning *sophisms* (for the Greeks so-termed "fallacious little conclusions")'. Where, then, did Seneca find *cauillatio* in Cicero? We find it attested in the *De Oratore* (2.247, 2.219) in reference to types of wit (*cauillatio* and *dicacitas* 'irony' and 'banter'), but this is not the sense that Seneca is discussing with *sophisma*, which is rather a kind of argument that is not logical but a 'quibble' or 'trickery' (LSJ s.v., II.3). Reid thought that, in his revision of the book, Cicero 'no doubt [...] interposed in the second edition the translation *cauillatio* which [Seneca] quotes.'[93] In any case, we see two translations from Cicero: first is the phrase *fallacia*, the noun is a lexical innovation formed by the diminutive morpheme -(*u*)*la* affixed to the established *con*-*fusio*.[94] In the (more recent) version, Cicero consolidates the concept of 'trickery'—expressed in the double translation *contorta*—with *cauillatio*, and *fallacia* established abstract in -*tio* attested as far back as Plautus in the sense of a 'jeering' or 'banter', now with the added metonymy of 'sophistical discourse' (*TLL* 3.648.17; *OLD*.). This term would become productive in later authors such as Seneca and Quintilian.

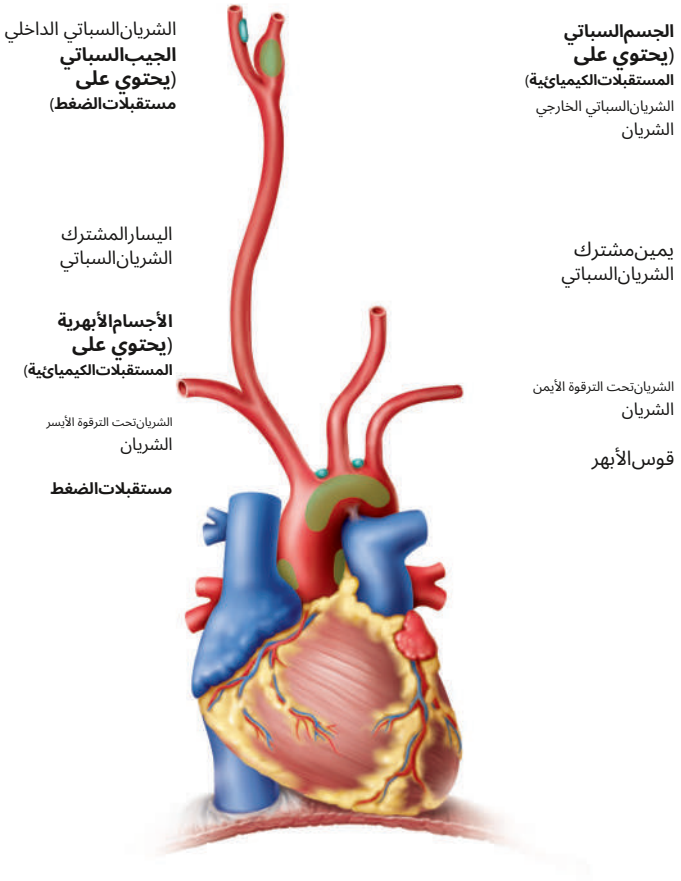
3.8 *Beatitudo, qualitas, and the Notion of 'Pseudo-Translation'*

As we shall see in authors such as Apuleius and Boethius, Cicero was successful in expanding the lexical resources of Latin when discussing philosophical subjects,[95] but how were these innovations to become acceptable to Latin readers and later Latin authors? A simple explanation is appeal to authority. Given Cicero's iconic stature among his successors as an eminent Roman author and historical figure, his unusual terminology could be borrowed without apology

93 Reid (1885), 265.

94 This innovation is also found in *Tusc.* 2.42 regarding the Stoics' syllogisms. This work was composed around the same time. Similarly, see also *interrogatiuncula* in Cic. *Piso* 21, and *cauillatio* in *de Or.* 2.158, quoted in Sen. *Ep.* 82.

95 Cf. Nicolas (2000), 144: 'Du coup, on s'explique fort bien que beaucoup de ces tentatives cicéroniennes (y compris certaines qui n'étaient peut-être que ludiques, au fond) aient été couronnées de succès et soient passées a la postérité, même s'il a fallu plusieurs générations pour que certains mots se fixent.'



الشكل 20.4 مستقبلات الضغط ومستقبلات الكيمياء في الشرايين فوق القلب. تتكرر الهياكل الموضحة هنا في الشرايين السباتية اليمنى في الشرايين السباتية اليسرى.

20.1 درجة مئوية الشعيرات الدموية

لكي يؤدي الدم وظيفته، يجب أن تمر العناصر الغذائية والفضلات والهرمونات وكريات الدم البيضاء بين الدم وسوائل الأنسجة، عبر جدران الأوعية الدموية. يحدث هذا في ثلاثة مواضع فقط: الشعيرات الدموية، وبعض الأوردة الصغيرة، والجيوب الوريدية، والتي سيتم شرحها لاحقاً. يمكننا اعتبار هذه المواضع بمثابة "الجزء الأساسي" من الجهاز القلبي الوعائي، لأن باقي أجزاء الجهاز موجودة لخدمة عمليات التبادل التي تحدث فيها. ونظراً لأن عدد الشعيرات الدموية يفوق عدد الأوردة الصغيرة بكثير، فهي تعتبر أكثر أهمية من الأوردة الصغيرة. تعتبر الشعيرات الدموية... *أوعية التبادل* من الجهاز القلبي الوعائي. تسمى الشرايين الصغيرة والشعيرات الدموية والأوردة الصغيرة أيضاً بـ **الأوعية الدموية الدقيقة (الدورة الدموية الدقيقة).**

تتكون الشعيرات الدموية (انظر الشكلين 20.1 و20.2 والصورة الافتتاحية لهذا الفصل) من بطانة وغشاء قاعدي فقط. يبلغ سمك جدرانها 0.2 ميكرومتر. ويبلغ متوسط قطرها حوالي 5 ميكرومتر عند الطرف القريب (حيث تستقبل الدم الشرياني)، ويتسع إلى حوالي 9 ميكرومتر عند الطرف البعيد (حيث تصب في وريد صغير)، وغالباً ما تتفرع على طول مسارها. وبما أن قطر كريات الدم الحمراء يبلغ حوالي 7.5 ميكرومتر، يجب أن تتمدد هذه الأوعية الدموية، التي يبلغ قطرها 100 سم، إلى أشكال مستطيلة لتمر عبر أصغر الشعيرات الدموية.

تقع جميع خلايا الجسم تقريباً على بعُد 60 إلى 80 ميكرومتراً (ما يعادل عرض أربع إلى ست خلايا) من أقرب شعيرة دموية. وهناك بعض الاستثناءات: فالشعيرات الدموية نادرة في الأوتار والأربطة، وغائبة تماماً في الأنسجة الطلائية والغضاريف وقرنية وعدسة العين.

أنواع الشعيرات الدموية

هناك ثلاثة أنواع من الشعيرات الدموية، يتم تمييزها من خلال مدى سهولة مرور المواد عبر جدرانها ومن خلال الاختلافات الهيكلية التي تفسر نفاذيتها الأكبر أو الأقل.

1. **الشعيرات الدموية المستمرة (الشكل 20.5 أ)** توجد هذه الأوعية في معظم الأنسجة والأعضاء، مثل العضلات الهيكلية والرئتين والدماغ. وتشكل خلاياها البطانية، المرتبطة ببعضها بواسطة روابط محكمة، أنبوباً متصلاً. وتتكون من طبقة رقيقة من البروتين والكربوهيدرات. **الصفيحة القاعدية**، يحيط هذا النسيج بالبطانة الداخلية للأوعية الدموية ويفصلها عن الأنسجة الضامة المجاورة. وتفصل بين خلايا البطانة الداخلية فجوات ضيقة تسمى **الشقوق بين الخلايا** يبلغ عرضها حوالي 4 نانومتر. يمكن للموادالمذابة الصغيرة، مثل الجلوكوز، المرور عبر هذه الشقوق، لكن معظم بروتينات البلازما والجزيئات الكبيرة الأخرى والصفائح الدموية وخلايا الدم تبقى محصورة. تفتقر معظم الشعيرات الدموية في الدماغ إلى الشقوق بين الخلايا، وتتميز بوصلات محكمة أكثر اكتمالاً تشكل الحاجز الدموي الدماغي الذي نوقش في الفصل 14.

تحتوي بعض الشعيرات الدموية المستمرة على خلايا تسمى **الخلايا المحيطة بالأوعية الدموية** تقع الخلايا المحيطة بالأوعية الدموية خارج البطانة الداخلية للأوعية. ولها زوائد طويلة تلتف حول الشعيرات الدموية. تحتوي هذه الخلايا على نفس البروتينات الانقباضية الموجودة في العضلات، ويعتقد أنها قادرة على الانقباض وتنظيم تدفق الدم عبر الشعيرات الدموية. كما يمكنها التمايز إلى خلايا بطانية وخلايا عضلية ملساء، وبالتالي تساهم في نمو الأوعية الدموية وإصلاحها.

2. **الشعيرات الدموية المثقبة** تحتوي على خلايا بطانية مع بقع من **مسام الترشيح (الفتحات)**[5] **(الشكل 20.5 ب، ج)**. يبلغ قطر هذه المسامات حوالي 20 إلى 100 نانومتر، وغالباً ما تكون مغطاة بغشاء بروتيني سكري أرق بكثير من غشاء البلازما الخلوي. تسمح هذه المسامات بمرور الجزيئات الصغيرة بسرعة، لكنها مع ذلك تحتفظ بمعظم البروتينات والجسيمات الأكبر حجماً في مجرى الدم. تعُد الشعيرات الدموية المثقبة مهمة في الأعضاء التي تقوم بعمليات امتصاص أو ترشيح سريعة، مثل الكلى والغدد الصماء والأمعاء الدقيقة والضفائر المشيمية في الدماغ.

3. **الجيوب الأنفية** هي فراغات غير منتظمة مملوءة بالدم في الكبد ونخاع العظم والطحال وبعض الأعضاء الأخرى **(الشكل 20.6)**. هي ممرات ملتوية ومتعرجة، يتراوح عرضها عادةً بين 30 و40 ميكرومتراً، وتتخذ شكل النسيج المحيط بها. تفصل بين الخلايا البطانية فجوات واسعة بدون صفيحة قاعدية، وغالباً ما تحتوي هذه الخلايا أيضاً على

[5] *فافذة*=نافذة

This is one solution to the perennial debate amongst comparative literary and translation theorists regarding the 'translatability' of texts, especially poetry and philosophy. For example, STEINER wrote: '[S]o far as philosophy goes, problems of untranslatability strike at the heart of the whole philosophic enterprise.'[101] Keeping in mind this notion of 'getting away with it' as applied to translation theory, we can also use the concept of a 'pseudo-translation' to apply to ancient authors' techniques used to interpret Greek philosophical expressions. As noted in ROBINSON,[102] a pseudo-translation is defined as a text that not merely pretends, purports, or frequently is taken to be a translation, but also a translation that is often taken to be an original work. A pseudo-translation could be defined as a work whose status as 'original' or 'derivative' is, for any social or textual reason, problematic. We do not classify Cicero's dialogues as close technical 'translations' of Greek texts, but we might still refer to them as such—as he ironically described them with the self-effacing phrase ἀπόγραφα *sua* 'that they are mere transcriptions', i.e. of Greek philosophy (*Att.* 12.52.3). However, consider the dialogue *De re p.*, a work one might construe as a counterpart to Plato's *Resp.*, although Cicero's is an original with a distinctly Roman political agenda, borrowing concepts from, *inter alia*, Platonic philosophy.[103] The rhetoric of Cicero's prefaces,[104] especially regarding the sharing of Greek knowledge with fellow Roman citizens and articulating the concepts of Plato and other Greek philosophers to the Latin-reading public might, therefore, be viewed with a degree of agnosticism. Certainly, with some texts such as the *Tim.*, Cicero sought to Latinize Platonic works for a Roman readership, but he was also creating original works, promoting some schools of thought over others and adding his own judgement (e.g. *Fin.* 1.16) to the terminology under discussion. The result was a renovation of Greek philosophy into, and within, a Latin linguistic framework. The idea that Cicero was essentially a creative, non-technical writer carrying out a kind of pseudo-translation is, therefore, a useful one to keep in mind.

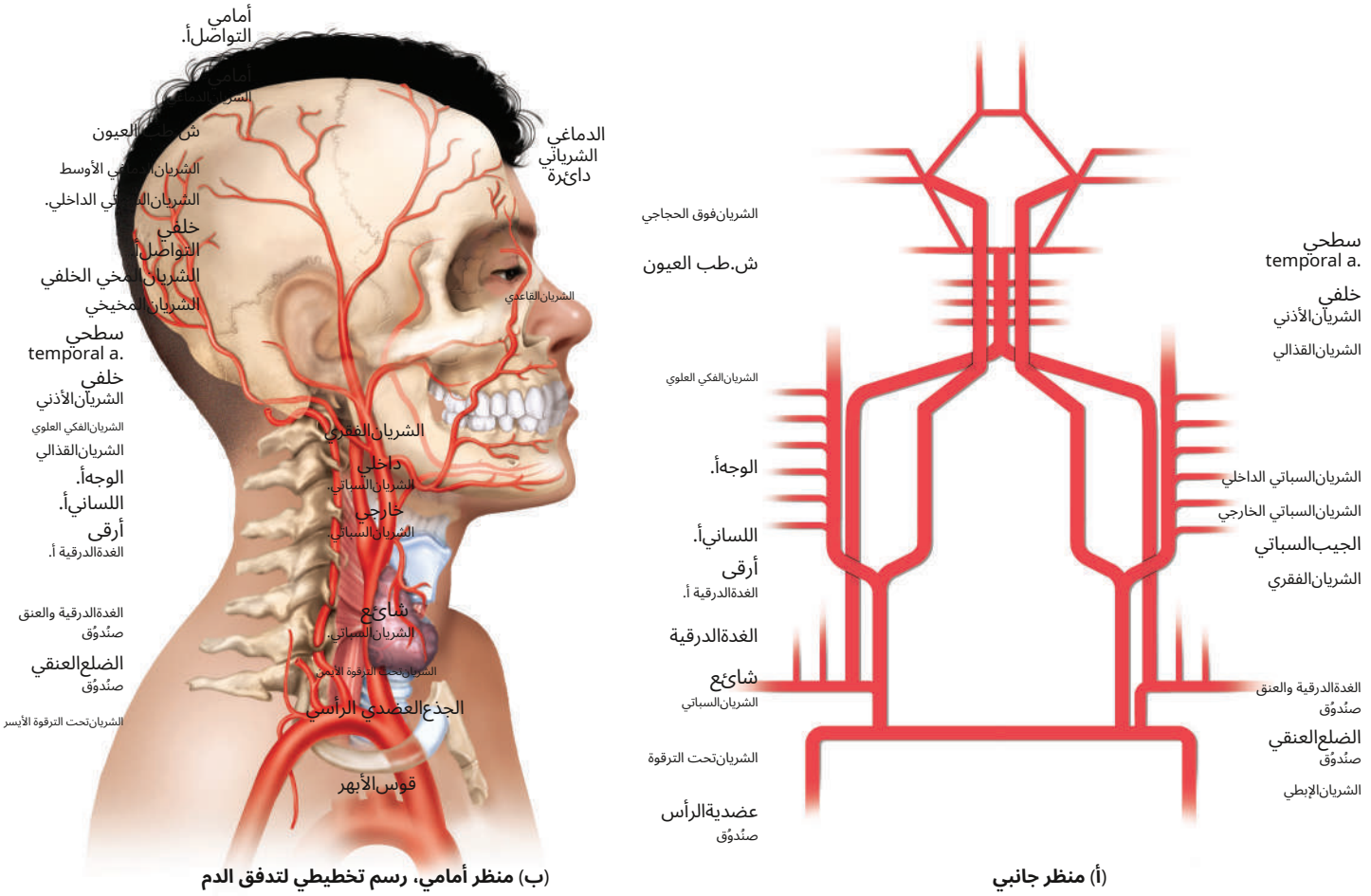
We come now to the term *qualitas* in Cicero's philosophical works. In the Latin of his era, to use a sentence such as *earum igitur qualitatum principia* (26) might amount to using something like a low-level malapropism in everyday conversation—at least to ordinary Latin speakers or

101 STEINER (1975/1998), 251.

102 ROBINSON (1998), 183.

103 Cicero's Latinizing of Greek philosophy is mirrored in a variety of ways across Cicero's literary style, whether political, rhetorical, or linguistic. See for example ALBRECHT (2003), 74 (the Latinization of Greek cosmology) and 208–209 (of Greek mythological names).

104 E.g. *Fin.* 1.1–10.



(أ) **منظر جانبي** (ب) **منظر أمامي، رسم تخطيطي لتدفق الدم**

الشكل20.28الشرايين السطحية (خارج الجمجمة) للرأس والرقبة.(أ) منظر جانبي. ب) مخطط تدفق الدم، منظر أمامي. يوضح الجزء العلوي من المخطط الدورة الدموية الدماغية في الشكل 20.29.

اذكر الشرايين، بالترتيب، التي يجب أن تسلكها كريات الدم الحمراء للوصول من البطين الأيسر إلى جلد الجانب الأيسر من الجبهة.

1.ال**الشريان السباتي الخارجي**يصعد هذا الشريان على جانب الرأسخارج الجمجمة، ويغذي معظم التراكيب خارج الجمجمة باستثناءمحجر العين. ويتفرع منه الشرايين التالية بالترتيب التصاعدي:

أ.ال**الشريان الدرقي العلوي**إلى الغدة الدرقية والحنجرة؛

ب.ال**الشريان اللساني**إلى اللسان؛

ج.ال**الشريان الوجهي**إلى جلد وعضلات الوجه؛

د.ال**الشريان القذالي**إلى الجزء الخلفي من فروة الرأس؛

هـ.ال**الشريان الفكي العلوي**إلى الأسنان، والفك العلوي، وتجويف الفم،والأذن الخارجية؛ و

و.ال**الشريان الصدغي السطحي**إلى عضلات المضغ، وتجويف الأنف،والجانب الجانبي من الوجه، ومعظم فروة الرأس، والأم الجافية.

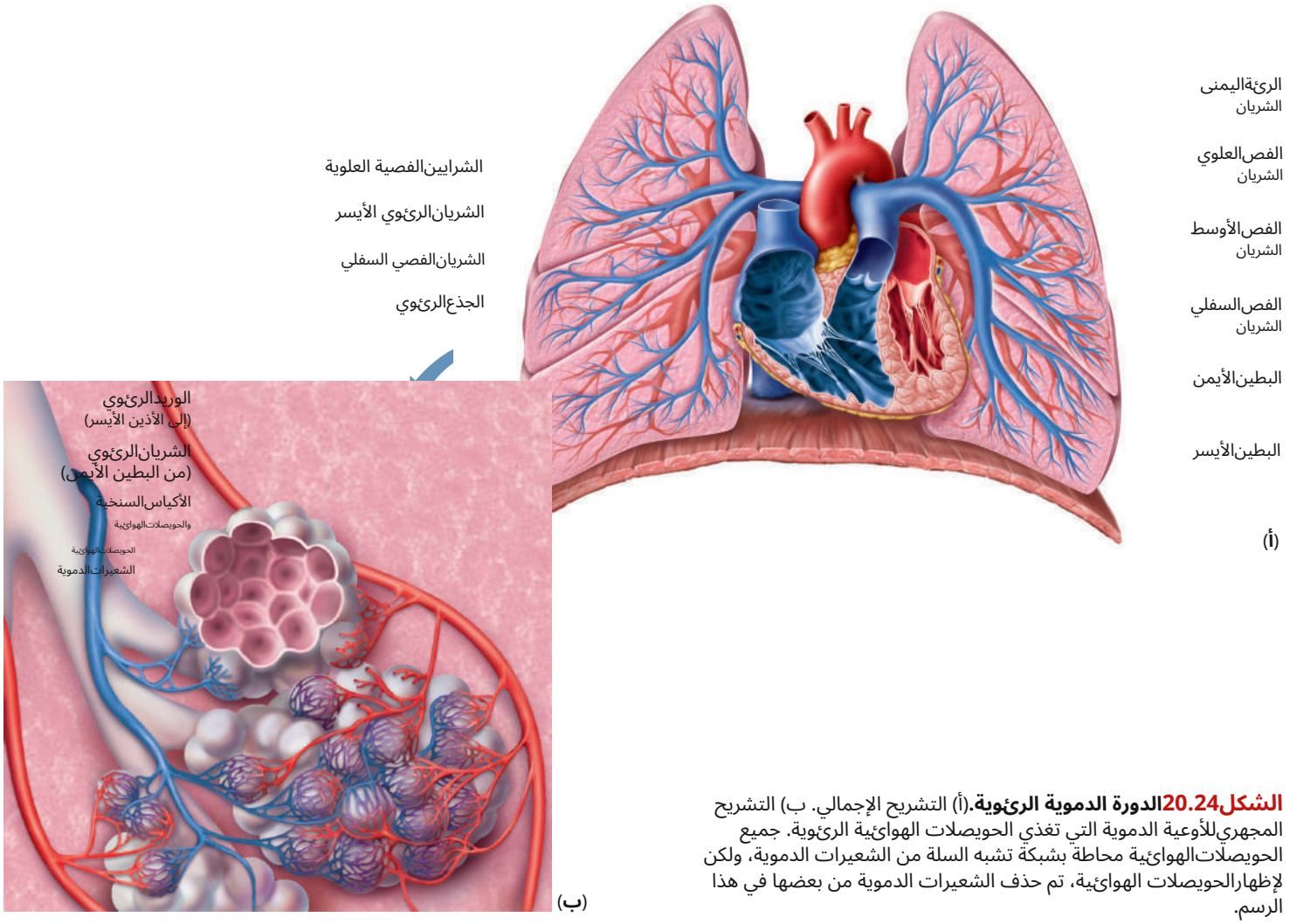
2.ال**الشريان السباتي الداخلي**يمرّهذا الشريان باتجاه منتصف زاويةالفك السفلي، ويمرّعبر القناة السباتية للعظم الصدغي إلى تجويفالجمجمة. وهو يغذي الحجاجين.

وحوالي80% من المخ. لذا، فإن الضغط على الشرايين السباتية الداخليةبالقرب من الفك السفلي قد يسُبب فقدان الوعي (لكنه أمرخطير ويجب عدم القيام به أبداً من باب التسلية، كما يفعل بعضالناس). الفروع الرئيسية للشريان السباتي الداخلي(**الشكل 20.29**)نكون

أ.ال**الشريان العيني**،والذي يخرج من تجويف الجمجمة عبر القناةالبصرية ويزود الحجاج والأنف والجبهة بالدم؛

ب.الكبير**الشريان الدماغي الأوسط**،والذي يقع في التلم الجانبي للمخ،ويغذي الفص الجزيري، ثم يصدر فروعاً عديدة إلى المنطقة الجانبيةللفصوص الأمامية والصدغية والجدارية للدماغ؛ و

ج.الأصغر**الشريان الدماغي الأمامي**،والذي يمر إلى الأمام، ثم ينعطفللخلف وينحني للخلف فوق الجسم الثفني حتى الحد الخلفيللفص الجداري؛ ويعطي فروعاً واسعة للفصين الجبهي والجداري.



الشكل20.24الدورة الدموية الرئوية.(أ) التشريح الإجمالي. ب) التشريح المجهريللأوعية الدموية التي تغذي الحويصلات الهوائية الرئوية. جميع الحويصلاتالهوائية محاطة بشبكة تشبه السلة من الشعيرات الدموية، ولكن لإظهارالحويصلات الهوائية، تم حذف الشعيرات الدموية من بعضها في هذا الرسم.

ثميدخل الرئة ويتفرع منه عدد متغير من الشرايين الفصية السفلية إلى الفصالسفلي. (تحتوي الرئة اليسرى على فصين فقط).

في كلتا الرئتين، تؤدي هذه الشرايين في النهاية إلى شبكات شعرية صغيرةتشبه السلال تحيط بالحويصلات الهوائية الرئوية (أكياس الهواء). وهنايتم تفريغ الدم من ثاني أكسيد الكربون.$_2$Oويلتقط $_2$Oبعد خروج الدم من الشعيراتالدموية السنخية، يتدفق إلى الأوردة الصغيرة والأوردة، ويؤدي في النهاية إلى الشريان الرئوي الرئيسي**الأوردة الرئوية**التي تخرج من الرئةعند سرة الرئة. ويستقبل الأذين الأيسر للقلب وريدين رئويين على كل جانب (انظر الشكل 19.5ب).

يتمثل الغرض الرئيسي من الدورة الدموية الرئوية في تبادل ثاني أكسيدالكربون$_2$لـ $_2$Oكما تتلقى الرئتان إمداداً دموياً جهازياً منفصلاً عن طريق*الشرايين القصبية*((انظر القسم 20.7د).

قبل أن تتابع

أجب عن الأسئلة التالية لاختبار فهمك للقسم السابق:

24. تتبع مسار خلية الدم الحمراء من البطين الأيمن إلى الأذين الأيسر، وقم بتسمية الأوعية الدموية على طول الطريق.

25. للرئتين مصدران منفصلان للدم الشرياني. اشرح وظائفهما.

20.7 الأوعيةالدموية الجهازية

المنطقةالمحورية

مخرجاتالتعلم المتوقعة

بعدإتمام هذا القسم، ينبغي أن تكون قادراً على

أ. تحديد الشرايين والأوردة الجهازية الرئيسية في المنطقة المحورية؛ و

ب. تتبع تدفق الدم من القلب إلى أي عضو رئيسي في المنطقة المحوريةوالعودة إلى القلب.

الدائرةالجهازية((**الشكلان 20.25 و20.26**)يزُودّ هذا الجهاز جميع الأعضاءبالأكسجين والمغذيات، ويزُيل فضلاتها الأيضية. وتعُدّ الدورة الدمويةالتاجية، التي سبق وصفها، جزءاً من هذه العملية. يستعرض هذا القسمالشرايين والأوردة المتبقية في المنطقة المحورية - الرأس والرقبة والجذع.أما الأقسام التالية، من 20.7أ إلى 20.7ز، فتتتبع تدفق الدم الشرياني وعودته الوريدية، منطقةً تلو الأخرى.

quod si Graeci faciunt qui in his rebus magis nobis concedendum est qui haec n

> I will do my best to talk in Latin, except in the case of words of the sort now in question, to say "philosophy" or "rhetoric" or "physics" or "dialectic", which, like many others, are now habitually used as Latin words. I have therefore given the name of "qualities" to the things that the Greeks call *poia*, even though among the Greeks it is not a word in common usage but belongs to the philosophers and this is the case with many terms. But the dialecticians' vocabulary is not of the popular language, they use words of their own, and indeed this is a feature shared by almost all the sciences: either new names have to be coined for new things, or names taken from other things have to be used metaphorically. This being the practice of the Greeks, who have now been engaged in these studies for so many generations, how much more ought it to be allowed to us, who are now attempting to handle these subjects for the first time![110]

Cicero's character then concludes with approval, suggesting that Varro will be 'doing a service to your fellow countrymen if you not only enlarge the wealth of facts, as you have done, but of words also' (*Varro bene et iamme rit u videris de tuis civibus si ut of ses nec dicis ent id ac verb*). To which Varro replies: 'Then on your authority we will venture to employ new words, if we have to' (*audebi [n.] ns oe vrigs over bis uti si nec*). It seems not enough for Cicero simply to use an aside within the dialogue to clarify the introduction of an unusual technical term—as Socrates had done. He must also have his characters fully expound the justifications for using new words or adding new meanings to existing words: *aut enim novas rerum novarum facienda no—*i.e. neologisms or *exali* semantic augmentation.

Cicero was successful in introducing new Latin terms to replace Greek terms among authors composing philosophical works in Latin in the centuries after him, however not all of his translation choices were productive or fully understood. Many of the terms he introduced to treat philosophical concepts in Latin, though unknown or obscure in his own time, would become understood by later authors and regularly applied in different contexts. In Cicero's view, words such as *beator* or *beatus* might be called *aur* 'difficult' on the Roman ear

110 Trans. RACKHAM (1933/2005), adapted. Cf. Lucretius' *multa nov* entire sty in *DE RERUM* 1.136–139.

يذاكر مرشد

ñ قيمّنتائج تعلمك

لاختبارمعلوماتك، ناقش المواضيع التالية مع شريك دراسةأو كتابةً، ويفضل أن يكون ذلك من الذاكرة.

20.1التشريح العام للأوعية الدموية

1. تعريفات*الشرايين والأوردةوالشعيرات الدموية* فيما يتعلقبمسار تدفق الدم
2. طبقات الشريان أو الوريد، والاختلافات النسيجية العامةبينها
3. بنية ووظائف البطانة الداخلية للأوعية الدموية
4. موقع ووظيفة الأوعية الدموية
5. ثلاثة أحجام للشرايين؛ كيف ولماذا تختلف ليس فقطفي القطر، ولكن أيضاً من الناحية النسيجية

6. علاقة الشرايين الصغيرة بشبكة الشعيرات الدموية، ووظيفةالعضلات العاصرة قبل الشعيرات الدموية للشريانالصغير
7. موقع وبنية ووظيفة الجيوب السباتية والأجسام السباتيةوالأجسام الأبهرية

8. علم الأنسجة لأنواع الشعيرات الدموية الثلاثة وعلاقتهبوظائفها
9. تنظيم شبكة الشعيرات الدموية وكيفية تنظيم ترويتها
10. لماذا تسُمى الأوردة*أوعية السعة* وكيف يرتبط ذلكبالاختلاف الهيكلي بين الأوردة والشرايين

11. ما هي أوجه التشابه بين الشعيرات الدموية والأوردة ما بعد الشعيراتالدموية فيما يتعلق بتبادل السوائل؟
12. الاختلافات الهيكلية بين الأوردة العضلية والأوردةالمتوسطة والأوردة الكبيرة
13. بنية الصمامات الوريدية ووظيفتها، ومواقع وجودها،وسبب وجود صمامات في بعض الأوردة دونوجودها في الشرايين ذات الحجم المماثل

14. كيف تختلف الجيوب الوريدية عن الأوردة الأخرى، وأينتوجد؟
15. كيف تختلف أنظمة البوابة والوصلات عن مساراتتدفق الدم الأبسط؛ أنواع الوصلات وأغراضها

20.2ضغط الدم، والمقاومة، والتدفق

1. الفرق بين تدفق الدم والتروية

2. كيف يرتبط تدفق الدم بالمقاومة وفروق الضغط؛ والتعبيرالرياضي عن هذه العلاقات

3. كيفية تحديد ضغط الدم الانقباضي، وضغط الدم الانبساطي،وضغط النبض؛ وكيفية تقدير متوسط ضغط الدمالشرياني (MAP)، ولماذا يختلف متوسط ضغط الدم الشرياني من الرأس إلى القدم.

4. معاني*ارتفاع ضغط الدم* و*انخفاض ضغطالدم*
5. لماذا يؤدي تمدد الشرايين وانكماشها أثناء دورة القلبإلى تقليل ضغط النبض وتخفيف الضغط علىالشرايين الصغيرة؟
6. لماذا يكون تدفق الدم الشرياني نابضاً بينما يكون تدفق الدم الشعيريوالوريدي غير نابض؟
7. لماذا يرتفع ضغط الدم مع التقدم في السن
8. المتغيرات التي تحدد ضغط الدم
9. المتغيرات التي تحدد المقاومة المحيطية؛ وما إذا كانكل منها يتناسب طردياً أو عكسياً مع المقاومة؛وأيها الأكثر تغيراً من لحظة إلى أخرى

10. مصطلحات لتوسيع وتضييق الأوعية الدموية عنطريق انقباض العضلات واسترخائها

11. العلاقة الرياضية بين المقاومة المحيطية ونصف قطرالوعاء الدموي؛ ولماذا يرتبط ذلك بالتدفق الصفائحيللدم؛ ولماذا يجعل ذلك ردود الفعل الوعائيةمؤثرة للغاية على تدفق الدم

12. لماذا تنخفض سرعة تدفق الدم من الشريان الأورطي إلى الشعيرات الدموية،ثم ترتفع مرة أخرى من الشعيرات الدموية إلى الأوردة، ولكنها لا تصلأبداً إلى نفس المستوى في الأوردة كما كانت عليه في الشريان الأورطي؟
13. لماذا تؤثر الشرايين الصغيرة بشكل أكبر من أي فئةأخرى من الأوعية الدموية على تروية الأنسجة؟

14. ثلاثة مستويات للتحكم في ضغط الدم وتدفقه

15. آليات التحكم الموضعي في تدفق الدم على المدى القصيروالطويل؛ أمثلة على المواد الكيميائية الوعائيةوكيف يمكن أن تسبب فرط الدم التفاعلي
16. تكوين الأوعية الدموية وأهميته في علاج السرطان

17. دور المركز الحركي الوعائي في النخاع المستطيل فيالتحكم بتدفق الدم؛ المنعكسات الضغطية، والمنعكساتالكيميائية، والمنعكس الإقفاري النخاعي
18. آليات عمل الأنجيوتنسين II، والألدوستيرون، والبتيدات المدرة للصوديوم، والهرمون المضاد لإدرارالبول، والإبينفرين، والنورإبينفرين على ضغطالدم
19. كيف يمكن لحركة الأوعية الدموية أن تغير ضغط الدمفي الجسم ككل أو تعيد توجيه تدفق الدم من منطقة إلى أخرى؛ الظروف التي تستدعي إعادةتوجيه تدفق الدم

20.3الشعيرات الدموية وتبادل السوائل

1. معنى*التبادل الشعيري*،والمواد المستخدمة في العملية
2. ثلاثة مسارات وأربع آليات تمر من خلالها المواد عبرجدران الأنابيب الشعرية
3. المواد التي يتم تبادلها عن طريق الانتشار البسيط؛العوامل التي تحدد ما إذا كان بإمكان مادةما الانتشار عبر جدار الشعيرات الدموية
4. النقل الخلوي عبر الشعيرات الدموية، وبعض المواد التي يتم تبادلهابهذه الطريقة
5. في الترشيح الشعري، توجد ثلاث قوى تسحب السائلخارج الشعيرات الدموية وقوة واحدة تسحبالسائل إلى داخلها.
6. قيم وتأثيرات قوى التبادل الشعيري عند طرفي الشعيرةالدموية الشرياني والوريدي، وكيف تمكنّ الشعيرةالدموية من إطلاق السوائل من أحد طرفيهاوإعادة امتصاصها من الطرف الآخر.

7. الكميات النسبية للسوائل التي يتم إطلاقها وإعادةامتصاصها بواسطة أنبوب شعري نموذجي،وما الذي يعوض الفرق بين الترشيح وإعادةالامتصاص
8. دور سحب المذيب في التبادل الشعري
9. لماذا يمكن أن تتغير ديناميكيات امتصاص الشعيراتالدموية من لحظة إلى أخرى أو تختلف في أماكن مختلفة من الجسم؛ أمثلة على الأماكن التي تشارك فيها الشعيرات الدموية كلياً في الترشيحالصافي أو إعادة الامتصاص
10. المواد الكيميائية التي تؤثر على نفاذية الشعيرات الدموية والترشيح
11. ثلاثة أسباب للوذمة، وعواقبها المرضية

20.4عودة الدم الوريدي والصدمة الدورية

1. تعريف*العودة الوريدية*،وخمس آليات تحركها

2. كيف تعمل مضخة العضلات الهيكلية ولماذا تعتمدعلى الصمامات الوريدية
3. لماذا تزيد التمارين الرياضية من عودة الدم الوريدي
4. لماذا قد يؤدي الخمول البدني إلى تجمع الدم في الأوردة؛عواقب تجمع الدم في الأوردة
5. تعريف*صدمة الدورة الدموية*
6. فئتان أساسيتان من الصدمة الدورية، وثلاثة أشكالمن صدمة انخفاض العائد الوريدي، والحالاتالتي قد يحدث فيها كل شكل من أشكالالصدمة
7. لماذا لا يمكن تصنيف الصدمة الإنتانية والصدمة التأقية بشكل قاطعضمن أي فئة واحدة من صدمات الجهاز التنفسي السفلي؟
8. الاختلافات بين الصدمة المعُاوضَة والصدمة غير المعُاوضَة

20.5مسارات الدورة الدموية الخاصة

1. القيمة النموذجية لتدفق الدم الدماغي وأهمية ثباتها

terms. Take the famous example of *sustinere* versus *inhibere* for Carneades' ἐποχή in *Ac.* 1.34.21.3. Atticus objected to Cicero's use of *sustinere* as an inadequate equivalent and presumably changed it to *inhibere*. Cicero, although initially accepting the change, disagreed and asked Atticus to amend it back to *sustinere*. He further asks Atticus to tell Varro to amend it in his version too *si forte* (*permutavi* presumably because of Atticus' suggestion).[111] This careful discussion about the correct Latin equivalent for a Greek word adds force to GLUCKER's point that many of the overt glosses in Cicero's *philosophia* might have functioned not only as rhetorical or explanatory devices for the benefit of his readers, but also as 'preemptive defence' mechanisms against future criticism from his peers.

Thus far in this chapter, we have seen how Cicero made use of specific interpretative tools in translating specific terms of Greek philosophy. The examples I have examined provide a window into Cicero's translation method or 'praxis', if one may call it that, and indicate that there was an interpretative strategy on his part in combining established terms familiar to a Roman audience with Greek technical terms that required articulation in Latin. In using techniques such as pleonasm, multiple translation, and circumlocution, Cicero demonstrated that he did not always require a one-to-one correspondence between a given word in Greek and one in Latin. He could use the multiple shades of meaning (synonymy) in selected Latin terms (established and neologized) to expand his semantic range and to encapsulate more effectively the meaning of the original.[112] To use TAYLOR's phrasing, 'the readings of partial expressions depend on those of others and ultimately of the whole'.[113] We also observed in this chapter that Cicero's translation praxis was not always limited to semantic or conceptual concerns but also included stylistic exigencies, by which the appropriateness of a chosen term depended upon its acceptability both phonologically and morphologically. Interestingly, Plutarch was probably the earliest writer to observe Cicero's translation praxis and his comments are strongly in agreement with the findings in this chapter. In his biography of Cicero, he summarized that the Roman statesman had translated many terms of Greek dialectics and natural philosophy into Latin using both metaphorical language and 'new and fitting terms' to make them 'intelligible and familiar' to his audience (τὰ μὲν μεταφοραῖς, τὰ δ' οἰκειότησιν ἄλλαις γνώριμα καὶ προσήγορα μηχανησάμενος).[114]

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111 See discussion in CESARI (1829), 623 and recently in GURD (2012), 73.

112 For another example of 'multiple translations', see the discussion of ἀξίωμα in GLUCKER (1995), 131–132.

113 TAYLOR (1985), 18.

114 Plut. *C. i.* 40.2.

4 The Ciceronian Legacy

The case studies of authors surveyed in the remainder of this book testify to the importance and influence of Cicero's philosophical translations on posterity. In spite of Mommsen's and others' derision of the *philosophi* over a century ago, Cicero's creation of a distinct philosophical vocabulary in Latin has received effusive praise. He has been viewed as the high water mark of lexical innovation in Latin literary history.[115] Romans in Cicero's time, and after, cited his achievements in forging a Latin philosophical vocabulary and could evaluate his efforts by measuring the implementation of his philosophical terms against their Greek originals.[116] Was this simply due to a 'first-mover advantage' however, given that we have so little surviving Latin philosophy prior to Cicero? As the opening of this chapter touched upon, there were certainly Roman philosophers, and some of them Latinized Greek terms on a notable scale, e.g. a certain Stoic figure named 'Sergius Plautus', according to Quintilian's testimony. This first-mover advantage might be partly true, if only because the scale of Cicero's *philosophi* was probably not matched by anyone else except for Lucretius, whose aims and compositions were quite different. It could also have been due to Cicero's *auctoritas* as one of the most well-known Roman politicians, whose works were revered from the Imperial age to Late Antiquity, the Middle Ages, and (especially) the Renaissance. Cicero, as an exemplar for oratory and rhetorical method, attracted canonical status to his speeches in the Western tradition and by proxy his philosophical works too. 'Cicero the Orator, the Politician, and the Lawyer' becomes responsible for the fame and influence his philosophical works came to enjoy, rather than the literary or intellectual merit of the philosophical works *per se*. Whatever reasoning one follows, much of Cicero's philosophical vocabulary became productive and influential in the conception of Western philosophy into posterity. However, not all of his

115 Cf. Moreschini (1979), 100 in the context of the Latin *traduzioni*; see also Martinotti (1952), 12–16. Note, I do not include in this 'high water mark' the technical works of antiquity that increasingly transposed Greek technical terms in various fields into Latin, see e.g. Fögen (2009), 90 f. For Cicero's contributions to Latin philosophical vocabulary in general, see Laurand (1936), 68 ff.; Horsfall (1979), 81; Puelma (1980), 153–154; Lévy (1992), 106; Hösle (2008), 147–148; Glucker (2015), 46.

116 See e.g. Plut. *Ci.* 40.1–2; see also comments in Puelma (1980), 153–154. See also Clavel's early, superlative praise of Cicero's translation and lexical innovation efforts (1868, 291): 'Ille [Cicero] primus inter Latinos [...] studia, quae in reconditis artibus versantur, illustravit: primus eadem in patrium convertere sermonem ausus est; arduum opus, immensum etiam vel ingenio Ciceronis, quamquam altissime insurgit, et incoeptis crescit amplissimis.'

بشكلرئيسي في المناعة التكيفية. أنواع معينة من الخلايا الليمفاوية تسمى *الخلايا التائيةالمساعدة*تؤدي وظيفة في كل من المناعة الفطرية والمناعة المكتسبة.

5. **الخلايا الوحيدة**هي خلايا الدم البيضاء التي تهاجر من الدم إلى الأنسجةالضامة وتتحول إلى خلايا بلعمية. تسُمى جميع خلايا الجسم التيتتمتع بقدرة عالية على البلعمة، باستثناء خلايا الدم البيضاء، بالخلاياالبلعمية. **نظام الخلايا البلعمية.**تدُرج الخلايا المتغصنة ضمنهذه المجموعة رغم أنها تنشأ من خلايا جذعية مختلفة عن الخلاياالبلعمية، وتستخدم الالتقام الخلوي بوساطة المستقبلات بدلاً من البلعمة لابتلاع المواد الغريبة. بعض الخلايا البلعمية خلايا جوالة تبحثبنشاط عن مسببات الأمراض، بينما الخلايا الشبكية وغيرها ثابتةفي مكانها ولا تبتلع إلا مسببات الأمراض التي تصل إليها، على الرغممن أنها متمركزة استراتيجياً لهذا الغرض. تنتشر الخلايا البلعميةعلى نطاق واسع في الأنسجة الضامة الرخوة، ولكن توجد أيضاً أنواع متخصصة منها ذات مواقع أكثر تحديداً. *الخلايا الدبقية الصغيرة*في الجهاز العصبي المركزي، *البلاعم السنخية*في الرئتين، و *الخلاياالبلعمية النجمية*في الكبد، على سبيل المثال.

21.2ج بروتينات مضادة للميكروبات

تثُبطأنواعٌ متعددة من البروتينات تكاثر الميكروبات، وتوُفرّ مقاومةً قصيرة الأمدوغير محُددّة للبكتيريا والفيروسات الممُرضة. وقد تناولنا سابقاً العديدمنها على سطح الجلد، ونوُجهّ الآن اهتمامنا إلى عائلتين من البروتيناتالمضُادة للميكروبات الموجودة في الدم.

الإنترفيرونات

عندماتصُاب خلايا معينة (وخاصة الكريات البيضاء) بالفيروسات، فإنها تفرزبروتينات تسمى **الإنترفيرونات.** لا تقُيد هذه الإنترفيرونات الخليةَ المفُرزةلها كثيراً، لكنها بمثابة "كلماتها الأخيرة" التي تنُبه الخلايا المجاورة وتحميهامن العدوى. ترتبط هذه الإنترفيرونات بمستقبلات سطحية على تلكالخلايا وتفُعلّ أنظمة الرسائل الثانوية داخلها. يحُفز هذا تخليق عشراتالبروتينات المضادة للفيروسات التي تدُافع عن الخلية بوسائل مثلتحطيم الجينات الفيروسية ومنع تكاثرها. كما تنُشط الإنترفيرونات الخلاياالقاتلة الطبيعية والبلعميات، التي تدُمر الخلايا المصُابة قبل أن تطُلقسرباً من الفيروسات المتُكاثرة حديثاً. تكُسب الإنترفيرونات أيضاً مقاومةً للسرطان، لأن الخلايا القاتلة الطبيعية المنُشطة تدُمر الخلايا الخبيثة.

نظاممكمل

ال**نظام المتممة**هي مجموعة من 30 بروتيناً دفاعياً أو أكثر من فئة الغلوبولين.وقد أطلق عليها رائد علم المناعة بول إرليخ (1854-1915) هذاالاسم *إطراء*لأنه "يكمل عمل الأجسام المضادة"، وهذه بالفعل هي الوسيلةالرئيسية للقضاء على مسببات الأمراض في المناعة المعتمدة علىالأجسام المضادة. ومع ذلك، منذ زمن إرليخ، وجُد أن نظام المتممة مهمأيضاً في المناعة الفطرية.

تصُنعّبروتينات المتممة بشكل رئيسي في الكبد. وتدور في الدم بصورةغير نشطة، وتفُعلّ عند وجود مسببات الأمراض. وتسُمى البروتيناتغير النشطة بالحرفجورقم، مثل C3. التنشيط يقسمها إلى أجزاءيتم تحديدها بشكل أكبر بواسطة أحرف صغيرة (C3a و C3b، على سبيلالمثال).

يسُاهمنظام المتممة المنُشط في القضاء على مسُببات الأمراض عبر أربعطرق: الالتهاب، والتخلص المناعي، والبلعمة، وتحلل الخلايا. سندرس مساراتالتنشيط لفهم كيفية تحقيق كل هدف من هذه الأهداف. توجد ثلاثةمسارات من هذا القبيل.(**الشكل 21.15**):المسارات الكلاسيكية والبديلةواللكتينية.

ال**المسار الكلاسيكي**يتطلب الأمر وجود جسم مضاد لبدء العملية؛ لذافهو جزء من المناعة التكيفية. يرتبط الجسم المضاد بمستضد على سطحالميكروب ويغير شكله، كاشفاً عن زوج من *مواقع ربط المتمم*((انظر الشكل21.20). يرتبط المتمم C1 بهذه المواقع ويبدأ سلسلة من التفاعلات.تنُتج كل خطوة من هذه السلسلة إنزيماً يحفز إنتاج المزيد من الجزيئاتفي الخطوة التالية؛ كل خطوة هي عملية تضخيم، لذا ينتج عن بدايةصغيرة عدد كبير من جزيئات الناتج. في المسار الكلاسيكي، تسُمى هذهالسلسلة**تثبيت المتممة،**لأنه يؤدي إلى ارتباط سلسلة من بروتينات المتممةبالأجسام المضادة.

لاتتطلب المسارات البديلة ومسارات الليكتين أجساماً مضادة، وبالتاليفهي تنتمي إلى جهاز المناعة الفطري. يتحلل المتمم C3 ببطء وبشكلتلقائي في الدم إلى C3a وC3b. **مسار بديل،**يرتبط C3b مباشرةً بأهدافمثل خلايا الأورام البشرية والفيروسات والبكتيريا والخمائر. وهذا بدورهيحُفز سلسلة من التفاعلات، وهذه المرة مع *التأثير التحفيزي الذاتي* حيثيؤدي C3b إلى تسريع انقسام المزيد من C3 وإنتاج المزيد من C3b.

الليكتيناتهي بروتينات بلازما ترتبط بالكربوهيدرات. في **مسار الليكتين،**يرتبط الليكتين بسكريات معينة على سطح الخلية الميكروبية ويطلقسلسلة تفاعلات أخرى تؤدي إلى إنتاج C3b.

كمانرى، فإن انقسام C3 إلى C3a وC3b يمثل نقطة التقاء المسارات‌الثلاثة. ينتج عن هذين الجزأين من C3، بشكل مباشر أو غير مباشر،النتائج النهائية لنظام المتممة.

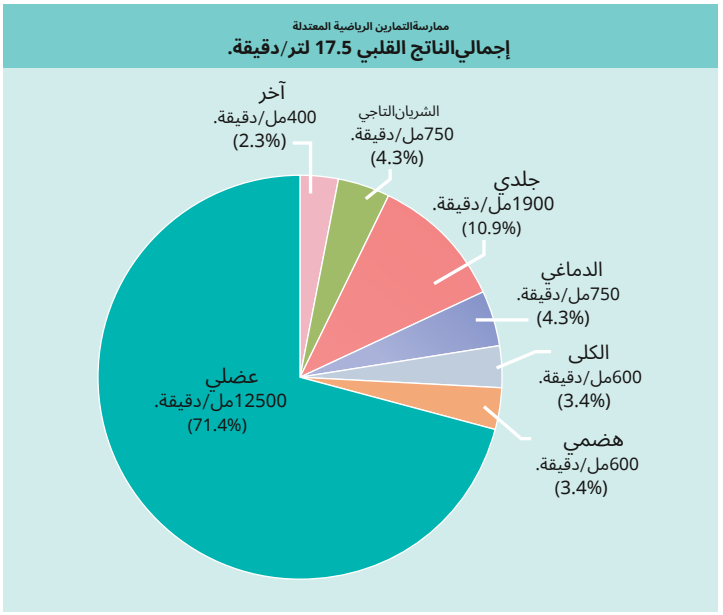
1. **اشتعال.**يحفز C3a الخلايا البدينة والخلايا القاعدية على إفراز الهيستامينومواد كيميائية التهابية أخرى. كما ينشط ويجذب العدلاتوالبلعميات، وهما العاملان الخلويان الرئيسيان في تدمير مسببات‌الأمراض في الالتهاب. سيتم شرح الأدوار الدقيقة لهذه الموادالكيميائية والخلايا في القسم الخاص بالالتهاب لاحقاً.

2. **التخلص المناعي.**يرتبط البروتين C3b بمعقدات المستضد-المضاد (Ab-Ag) على سطح خلايا الدم الحمراء. وعندما تدور هذه الخلايا عبر الكبد والطحال،تقوم البلاعم الموجودة في هذين العضوين بفصل معقدات المستضد-المضاد وتدميرها، مما يحافظ على سلامة خلايا الدم الحمراء. هذههي الوسيلة الرئيسية لتخليص مجرى الدم من المستضدات الغريبة.

3. **البلعمة.**تقوم الخلايا المتعادلة والبلعمية بابتلاع وهضم البكتيريا والفيروساتومسببات الأمراض الأخرى. ومع ذلك، لا تستطيع هذهالخلايا البلعمية ابتلاع الكائنات الدقيقة "العارية" بسهولة. ويساعدهاC3b عن طريق **طهاية**[8]يغُطي هذا البروتين الخلايا الميكروبيةويشُكلّ مواقع ارتباط للخلايا البلعمية. وكما وصفه إيلي ميتشنيكوف،فإنّ عملية التطعَضٌ تهُيئّ الخلايا الغريبة لتجعلها أكثرجاذبية للخلايا البلعمية.

[8] *أوبسون*=لإعداد الطعام

is the freer adaptation of an existing term in the target language to the meaning of a term in the source language (semantic augmentation)—a practice, as we have seen, which Cicero favoured.



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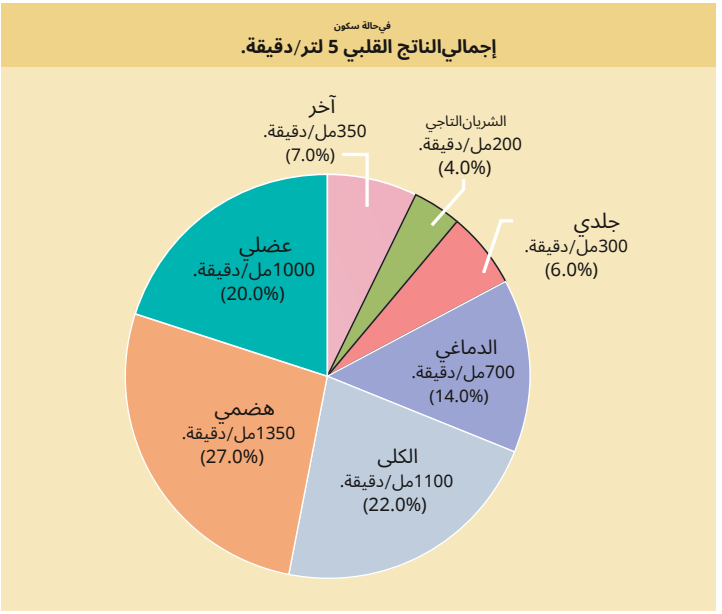


(أ)

الشكل20.18اختلافات تدفق الدم الجهازي وفقاً لحالات الرقم الهيدروجيني تدفق الدم أثناء التمرين.

يصعب‌دراسة آليات التبادل الشعيري كمياً لصعوبة قياس الضغط والتدفق‌في هذه الأوعية الدقيقة. مع ذلك، تم قياس ضغط الدم في بعض الشعيرات‌الدموية الجلدية النموذجية، حيث بلغ 32 ملم زئبق عند الطرف‌الشرياني و15 ملم زئبق عند الطرف الوريدي، على بعُد 1 ملم. ينخفض‌ضغط الدم الشعيري بسرعة نتيجة الاحتكاك الكبير الذي يواجهه الدم‌في هذه الأوعية الضيقة. تستغرق خلية الدم الحمراء من ثانية إلى ثانيتين‌لعبور شعيرة دموية نموذجية، بسرعة تقارب 0.7 ملم/ثانية.

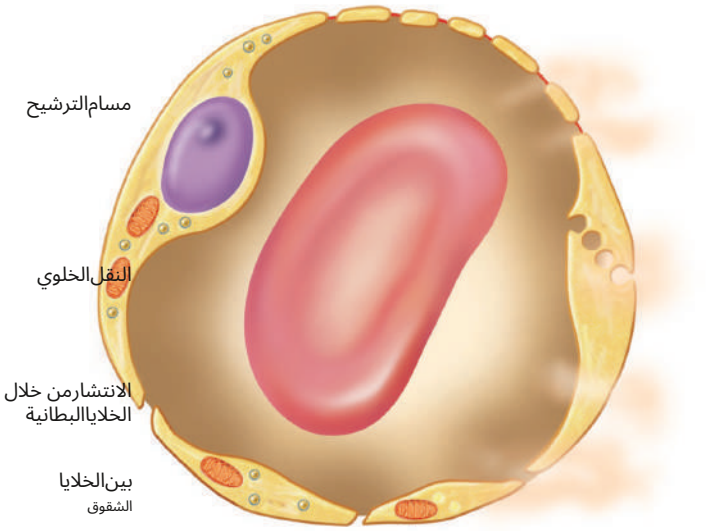
تمرالمواد الكيميائية عبر جدار الشعيرات الدموية بثلاثة مسارات (**الشكل20.19**):

1. سيتوبلازم الخلية البطانية؛
2. الشقوق بين الخلايا البطانية؛ و
3. مسام الترشيح في الشعيرات الدموية المثقبة.

آليات‌الحركة عبر جدار الشعيرات الدموية هي *الانتشار، النقل الخلوي، الترشيح،وإعادة الامتصاص.*

20.3أالانتشار والنقل عبر الخلايا

تعُدّ آلية انتشار الماء والمواد المذابة أهم آلية للتبادل. ينتشر الجلوكوز والأكسجين،لكونهما أكثر تركيزاً في الدم الجهازي منه في السائل النسيجي،خارج الدم. بينما ينتشر ثاني أكسيد الكربون والفضلات الأخرى، لكونهاأكثر تركيزاً في السائل النسيجي، إلى داخل الدم.$_2$وشركاه$_2$(تنتشر في‌اتجاهين متعاكسين في الرئتين). لا يكون هذا الانتشار ممكناً إلا إذا كان‌بإمكان المادة المذابة إما اختراق الأغشية البلازمية للخلايا البطانية أو إيجادممرات كبيرة بما يكفي للمرور من خلالها، وتحديداً مسام الترشيح والشقوق‌بين الخلايا. المواد القابلة للذوبان في الدهون مثل الهرمونات الستيرويدية،O_2، و CO_2تنتشر بسهولة عبر الأغشية البلازمية. أما المواد غيرالقابلة للذوبان في الدهون، مثل الجلوكوز والإلكتروليتات، فيجب أن تمرعبر قنوات الغشاء أو مسام الترشيح أو الشقوق بين الخلايا. وعادةً ما تحُتجزالجزيئات الكبيرة مثل البروتينات.



الشكل20.19 مسارات‌تبادل السوائل عبر الشعيرات الدموية
حائط.تتحرك المواد عبر جدار الشعيرات الدموية عن طريق مسام الترشيح (في الشعيرات‌الدموية المثقبة فقط)، وعن طريق النقل الخلوي، وعن طريق الانتشار عبرالخلايا البطانية، وعبر الشقوق بين الخلايا.

النقل‌الخلوي هو عملية تقوم فيها الخلايا البطانية بالتقاط المواد من أحدجانبي الغشاء البلازمي عن طريق الشرب الخلوي أو الإدخال الخلوي بوساطة‌المستقبلات، ثم تنقل الحويصلات عبر الخلية، وتطرح المواد من الجانب‌الآخر عن طريق الإخراج الخلوي (انظر الشكل 3.22). ربما لا يمثل هذاسوى جزء صغير من تبادل المواد المذابة عبر جدار الشعيرات الدموية، ولكن‌الأحماض الدهنية والألبومين والأجسام المضادة وبعض الهرمونات مثل‌الأنسولين تنتقل عبر البطانة بهذه الآلية.

1.1 *Loan-Words and Loan-Blends* (*Phonological Translation, Transference, Naturalization*)

LINDERBAUER (1891–1892/1892–1893) AND OKSALA (1954) have studied loan-words in Cicero's works in some detail, however, those that appear to have been attested first in Latin in Cicero's philosophical works are few and there are specific textual questions that arise when we investigate them further. That a loan-word appears in a philosophical work for the first time in Latin does not indicate by itself that the term is a philosophical one. Many first-attested loan-words in Cicero's philosophical works are of concrete objects (plants, diseases, place-names, persons, etc.). I include below only those loan-words that could properly be called 'philosophical' terms, or terms for things that could broadly be considered related to the subject matter of philosophy. As we discussed in the Introduction, many Greek loan-words pertaining to philosophy are used as 'code-switches', or introduced and then immediately glossed with a Latin word or phrase. For the reasons outlined in the Introduction, I have not included these in the data as lexical innovations, because they neither add to the Latin philosophical vocabulary nor are used as technical terms in Latin. The following are Greek loan-words used without Latin equivalents and as specific technical terms in the *philosophica*:

dialectice (διαλεκτικός) *Fin.* 2.17
dogma (δόγμα) *Luc.* 27, 29; *Fin.* 2.105[1]
empiricus (ἐμπειρικός) *Luc.* 122
melancholicus (μελαγχολικός) *Tusc.* 3.80
sophisma (σόφισμα) *Luc.* 75

The question of orthography when examining the Greek loans Cicero employs in his literary works is important to touch on here. In most cases, the Greek loans are in fact loan-blends, i.e. terms naturalized using Latin suffixation, hence REID (1885, 138): 'Cicero very seldom (excepting in his Letters) introduces a Greek word without a comment on its meaning, unless the word has been thoroughly naturalized.'[2] We might ask: in which words did Cicero preserve the Greek morphology of loans and in which did he naturalize them?

An interesting example is *dogma*, found in Cicero's *Luc.* (27, 29) and the *Fin.* (2.105). If we accept the chronology of composition that places the completion of the *Luc.* in April approximately the month of May 45 BC and the

1 See also discussion of this loan-word in HARTUNG (1970), 43 n. 5.

2 See discussion in HINCKERS (2020), 73 on Cicero's rare preference for a Greek loan-word, *sophos* (σοφός), instead of *sapiens* in *Div.* 2.1.

De Fin. was nearly contemporaneous (between mid-March and the end of June),[3] then we find an interesting progression of script choice. In *Luc.* 27, Cicero writes: *quae neque de se ipsa dubitare de quae philo* δόγματα, if we accept PLASBERG's (1908) printing of the neuter plural in the original orthography. This is a standard glossing that Cicero favoured when translating a Greek term, here with the sense translation *decr.*[4] In *Luc.* 29, he glosses again: *quoniam [...] id habere decr* (*scitum*) *initis* δόγμασι *adiac*, with PLASBERG again printing the Greek letters. Two ninth-century manuscripts[5] however read *dogmata* in *Luc.* 27 (one other[6] reads *dog*). In the *De Fin.* however, Cicero writes: *ut proverbia nonnulla*. Here, there is *sint* q no gloss or Greek orthography and neither MADVIG (1876/2010, 318) nor REYNOLDS (1998, 88) reports any *variae* in the paradosis. Did Cicero retain the Greek orthography in the *Luc.* but transliterate the word into Latin in the *De Fin.*? Alternatively, he might have simply transliterated the Greek term from the outset. The point here is not to confuse the issue, but to underscore the difficulties that come with making any assertions regarding the orthography of loan-words in general. We can concede that it is largely a matter of manuscripts and the choices made by scribes throughout the paradosis. There is ultimately no 'innovation' at play here on Cicero's part and the innovation we are interested in is the gloss, not the loan-word itself. The reason *dogma* is counted as a first-attested loan-word in this study is due to its use in the *De Fin.* without a Latin equivalent (i.e. *dogmis* is used instead of *decr*). In general, however, loan-words do not bear upon the data to a significant degree.

Finally, there are three instances of possible 'phonological translation' in the data from Cicero's *philo*. Whether these are simply coincidences of phonology as the result of morphological calques is worth bearing in mind. In the instance of *indifferens* rendering ἀδιάφορον, the phonology of the Greek is replaced by similar phonology in Latin.[7] *Levitas* (λεπτότης), though in fact a semantic calque and *mediocritas* (μετριότης), by analogy with other abstract nouns derived from second declension adjectives, e.g. *varius*, might be classified in a similar manner.

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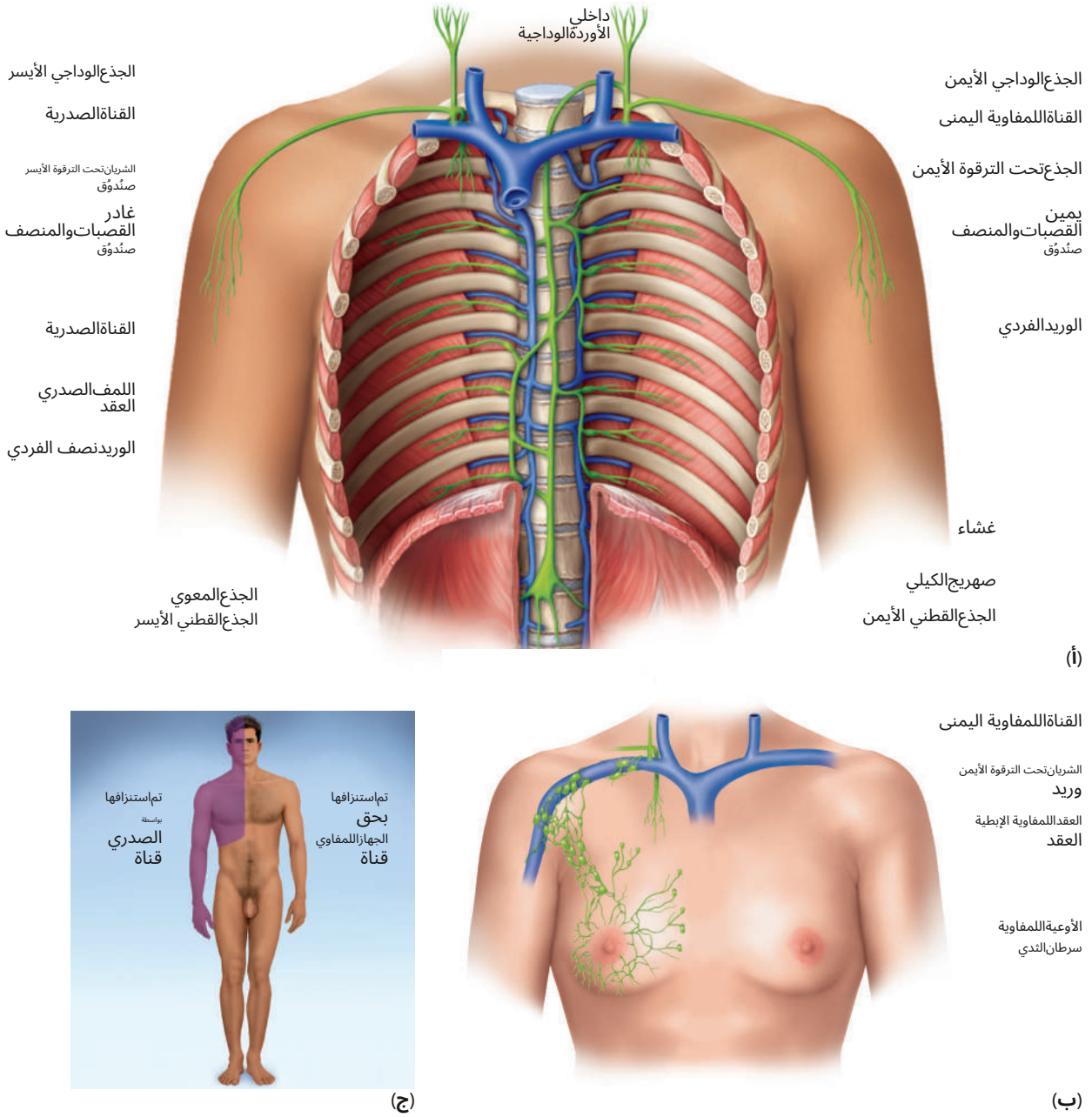
3 See e.g. MARINONE AND MALASPINA (2004/2009), 214.

4 Cf. Seneca, *Ep.* 95.10 using *decreta* and *placita* to render δόγματα and Apuleius' translation of δόγματα with *consita* in *Pl.* 1.189a (see selective commentary in Chapter 4).

5 **A** and **B** = Codex Vossianus fol. 84 and fol. 86.

6 **V** = Vindobonensis 189, (ninth-tenth century).

7 SEELE (1995), 29 sees this as a straightforward calque, as I classify it here too, but it might also be viewed as a phonological or 'echo' translation, cf. Lucretius' choice of *clinamen* over *declivitas*.



الشكل21.5الأوعية اللمفاوية في منطقة الصدر.(أ) الأوعية اللمفاوية في الصدر والجزء العلوي من البطن وعلاقتها بالأوردة تحت الترقوة، حيث يعود اللمف إلىمجرى الدم. ب) التصريف اللمفاوي للثدي الأيمن ومنطقة الإبط.
(ج) مناطق الجسم التي يتم تصريفها بواسطة القناة اللمفاوية اليمنى والقناة الصدرية.

لماذا يتم أخذ خزعة من العقد الليمفاوية الإبطية في كثير من الأحيان في حالات الاشتباه بسرطان الثدي؟

تدفقاللمف

يتدفقاللمف بقوى مشابهة لتلك التي تحكم عودة الدم الوريدي (انظر الفصل20)، باستثناء أن الجهاز اللمفاوي لا يملك مضخة كالقلب، ويتدفقاللمف بضغط وسرعة أقل من الدم الوريدي. الآلية الأساسية للتدفقهي الانقباضات الإيقاعية للأوعية اللمفاوية نفسها، والتي تنقبض عندمايتمدد السائل فيها. تمنع صمامات الأوعية اللمفاوية، مثل صمامات الأوردة، السائل من التدفق عكسياً.

ينتجالتدفق أيضاً عن انقباض العضلات الهيكلية للأوعية اللمفاوية، تماماً كماتفعل مضخة العضلات الهيكلية التي تحرك الدم الوريدي. ولأن الأوعية اللمفاويةغالباً ما تكون محاطة بشريان في غمد نسيجي ضام مشترك، فإننبض الشرايين يضغط أيضاً بشكل إيقاعي على الأوعية اللمفاوية المجاورة،مما يساهم في تدفق اللمف. تعمل المضخة الصدرية (التنفسية) علىتعزيز تدفق اللمف من تجويف البطن إلى تجويف الصدر أثناء الشهيق،تماماً كما هو الحال في عودة الدم الوريدي. وأخيراً، عند نقطة التجميع

***Timaeus* 6–7:** *a t q u i s i p u l c h e r e s t h i c , p m u n -d u s e f e c t o a e t e r n i t a t i s i e m i t a r , s i i m a , s q e u c i o u d s n e d i c t u q u f a s , g e n e r a t u m [e x e m p l u m e s t p r] . n o c a r e i t g i r t n , u o r s d u b u q u i a e t e r n i t a t e m [m a l u e r i] , q u e a x s d e q q u i i d e m n e q u e m q u a m p u l c h r i u s n e q u e e i u s a e d i f ı c a t o*

> And if this Universe is beautiful and if the Creator is good, then certainly he preferred to imitate the view of eternity, but if otherwise, which is impious to say, he followed a generated exemplar rather than an eternal one. There is no doubt therefore that he preferred to follow the eternal one, as indeed there is no Universe more beautiful, nor a builder of it more excellent.

The first dichotomy here is between the 'eternity' (τὸ ἀίδιον) of the Exemplar and of the generated Universe (γεγονός). By the time we get to 29b, we find the line τούτων δὲ ὑπαρχόντων αὖ πᾶσα ἀνάγκη τόνδε τὸν κόσμον εἰκόνα τινὸς εἶναι 'Again, if these premisses are accepted, then it is wholly necessary that the cosmos is a copy of something.' This conclusion has been glossed by Cicero with *u t s i t n e , q u a s s m e c h , m u n i t h u s m s i m u l a c r u m a e t a l i c u i s* 'so it is necessary that this (Universe), which we discern, is an everlasting image of something eternal' for reasons unclear at that stage in his translation but which, I suggest, anticipate Timaeus' later comments in the creation myth (37d). It is my argument then that this initial anticipatory glossing has caused some scholars to doubt Cicero's understanding of Plato's creation narrative.

Archer-Hind's (1888) commentary on this section of the dialogue suggests that Cicero's manuscript might have read εἰκόνα ἀίδιον τινὸς ἀιδίου, but argues that restoring the text to such a conjecture would be 'rash' given all of the existing manuscripts and Proclus' testimony. He concludes that, though the phrase εἰκόνα ἀίδιον might be defended on the same principle as αἰώνιον εἰκόνα in *T i* 37d, 'ἀίδιον properly means exempt from time and cannot strictly be applied to the phenomenal world, though its duration be everlasting'. As we shall see, such a distinction is, in fact, Neo-Platonic, a school whose doctrines were more than mere restatements of Plato's teachings,[68] and which cannot be sustained in the text of the *T i m a i* itself. Powell (1995a, 281) (half) defends Cicero's translation in arguing that **m u n d u m s i m u l a c r u m* would be *s e a l i* have been a 'legitimate gloss', but the addition of *a e t e* was an error: 'Did

68 Whittaker (1968), 131.

Cicero make a mistake in understanding his original here, or is the insertion of "aeternum" due to a copyist of Cicero's text? In neither of these cases is there unequivocal evidence to convict Cicero of carelessness.' More recently, HOENIG (following a suggestion from David Sedley)[69] argued Cicero's *similacrum aeternum* might have been an 'erroneous identification' based on a specific 'Form of Eternity' that, she suggests, does not correspond to the conceptual scheme in Plato's original. This would again mean that Cicero conflated the terms in his philosophical vocabulary. HOENIG further suggests (2018, 101) that Cicero 'failed to mark in his terminology the ontological difference between eternity and sempiternity'. However, I suggest here that such a conflation is not a Ciceronian error at all, but rather a close understanding of Plato's terminology and the connection between the Exemplar and the generated cosmos.

To return to the phrase *similacrum aeternum*, a textual search of the entire extant Platonic corpus in the *TLG* yields no instances of the pairing εἰκόνα ἀίδιον. Even as early as 29b, Plato only uses ἀίδιον to describe the eternal Exemplar. However, ARCHER-HIND's claim that ἀίδιον 'cannot strictly be applied to the phenomenal world, though its duration be everlasting' needs re-evaluation. By the time we reach 37d, we find in plain sight that Plato uses both ἀίδιον and αἰώνιον interchangeably and the concept of 'Time' in the Universe is revealed as simply an imitation of eternity, temporally everlasting (*Ti.* 37d):

> καθάπερ οὖν αὐτὸ [sc. τὸ παράδειγμα] τυγχάνει ζῷον ἀίδιον ὄν, καὶ τόδε τὸ πᾶν οὕτως εἰς δύναμιν ἐπεχείρησε τοιοῦτον ἀποτελεῖν. ἡ μὲν οὖν τοῦ ζῴου φύσις ἐτύγχανεν οὖσα αἰώνιος, καὶ τοῦτο μὲν δὴ τῷ γεννητῷ παντελῶς προσάπτειν οὐκ ἦν δυνατόν: εἰκὼ δ' ἐπενόει κινητόν τινα αἰῶνος ποιῆσαι, καὶ διακοσμῶν ἅμα οὐρανὸν ποιεῖ μένοντος αἰῶνος ἐν ἑνὶ κατ' ἀριθμὸν ἰοῦσαν αἰώνιον εἰκόνα, τοῦτον ὃν δὴ χρόνον ὠνομάκαμεν
>
> Accordingly, seeing that itself [the Exemplar] is an eternal Living Creature (ζῷον ἀίδιον), [the Demiurge] set about making this Universe, so far as He could, of a like kind. But since *the nature of the Living Creature* (αἰώνιος), it was impossible to attach this perfectly to what is generated; for which reason He planned to make some movable image of eternity (εἰκὼ [...] κινητόν τινα αἰῶνος) and, as He set in order the Heaven, of that eternity (αἰῶνος) which abides in unity He made an *Eternal Image* (αἰώνιον εἰκόνα), moving according to number, this being what we have called Time.

69 HOENIG (2018), 98 n. 135. However, for Cicero's (consistent) use of *aeternus* regarding 'god' or 'gods' generally in various other philosophical works, see MERGUET (1887), 108.

We do not have Cicero's version of this section due to a textual lacuna between 37c and 38c, but we might assume (if he did translate this section) that he translated both terms with either *aeternitas* or *aeternus*. This section is crucial, because, if Time were finite in Timaeus' myth, Plato would not have applied the self-same term to qualify it as he had done with the nature of the παράδειγμα—*both* are modified with αἰώνιον. Similarly, the term ἀίδιον is not confined to the timelessness of the Exemplar, but also to the stars and heavenly bodies as well (40b5)—temporal objects.[70] WHITTAKER's analysis of this section and other instances of the conflation of ἀίδιον, αἰώνιον, and ἀεί, usefully demonstrates the salient issue here: Plato had no strict or systematic definition of 'eternity' or 'everlasting duration' and often switched between terms when describing the atemporal nature of the Exemplar and the temporal infinite nature of Time itself.[71]

The diachrony of ἀίδιον and αἰώνιον is central to Western intellectual history and is beyond the scope of this analysis, but the simplest explanation is as follows: ARCHER-HIND is correct insofar as Neo-Platonists such as Plotinus (e.g. *Enn.* 3.7.3) and Proclus would later see a distinction between ἀίδιον and αἰώνιον.[72] The former was seen as an existential 'eternity', the latter 'life, individual duration'.[73] Proclus spoke of two species of ἀϊδιότης ('everlastingness'), one was existential (αἰώνιον) and self-constituted, the other ever-becoming in space and time, composed of parts:

> Proc. Inst. 55: ἐκ δὴ τούτων φανερὸν ὅτι διττὴ ἦν ἡ ἀϊδιότης, αἰώνιος μὲν ἄλλη, κατὰ χρόνον δὲ ἄλλη· ἡ μὲν ἑστῶσα ἀϊδιότης, ἡ δὲ γινομένη· καὶ ἡ μὲν ἠθροισμένον ἔχουσα τὸ εἶναι καὶ ὁμοῦ πᾶν, ἡ δὲ ἐκχυθεῖσα καὶ ἐξαπλωθεῖσα κατὰ τὴν χρονικὴν παράτασιν· καὶ ἡ μὲν ὅλη καθ' αὑτήν, ἡ δὲ ἐκ μερῶν, ὧν ἕκαστον χωρίς ἐστι κατὰ τὸ πρότερον καὶ ὕστερον
>
> The perpetuity (ἀϊδιότης) we spoke of was of two kinds: one eternal (αἰώνιον), the other in Time (κατὰ χρόνον); the one a perpetual steadfastness,

70 See MASON (2006), 178; WHITTAKER (1968), 139; ILIEVSKI (2015), 7.

71 WHITTAKER (1968), 139–140. See also KARFÍKOVÁ (2011), 445.

72 See the discussion in KARFÍKOVÁ (2011), 444–448. Though not all scholars agree that there was a clear-cut distinction in Plotinus' thought (see e.g. BEUTLER AND THEILER [1967], 519), there were certainly distinctions developing after his time, e.g. in Proclus. So also in Latin, e.g. Boethius' distinction of *aeternitas* and *perpetuitas* (*Cons.* 5.6.30 f.) and, in the Renaissance, Marsilio Ficino's translation of ἀιδιότης as *sempiternitas*, following Proclus' distinction of two species of 'eternity': *aevum* or *aeternitas* and *sempiternitas* (*Plat. Theol. de aeternitate animorum libri* [1482], 7.2.1 [721]). *tempore, commentum*

73 See further FESTUGIÈRE (1949), 172–189; BEIERWALTES (1981), 145–147; KARFÍKOVÁ (2011), 445 n. 26.

> the other a perpetual process; the one having its existence concentrated in a simultaneous whole, the other diffused and unfolded in temporal extension; the one whole in itself, the other composed of parts each of which exists separately in an order of succession.[74]

Thus in later ontology, ἀίδιον came to have both the sense of that which has no temporal beginning or end and that which had a temporal beginning but is everlasting. In Timaeus' account, the generated copy of the Exemplar is a ζῷον ἀίδιον and possesses a nature that is αἰώνιον. Cicero translates both with the abstract *aeternitas*, understanding from Timaeus' account that since it was 'impossible' to attach the αἰώνιον quality perfectly to the generated Universe, the Demiurge instead made the Universe as an imitation, in the form of a 'movable image' of αἰώνιον. This movability progresses arithmetically; that is to say, in a set order, for an infinite duration in the form of χρόνος.[75]

A glance at a dialogue contemporary to Cicero's *Timaeus*, the *De Natura Deorum* (45 BCE), gives us further insight. Cicero uses the Epicurean Velleius to assail the Platonist position on creation, specifically the Timaean narrative (*N.D.* 1.18):

> *non modo natum mundum introduxerit sed etiam dixerit fore sempiternum. hunc ego physiologiam, id est naturae rationem aeternum esse posse?*
>
> [Plato] represented the world not only as having had an origin but even almost made by hand, also said that it would be everlasting (*sempiternum*). Can you suppose that someone could have a taste for natural philosophy if he thinks that anything that has come into being can be eternal (*aeternum*)?

Velleius' attack is simply ideological, in the sense that he understands synonymy between *sempiternum* and *aeternum* to mock the Platonic creation the-

74 Trans. Dodds (1963), adapted. Cf. also Arist. *Cael.* 279a25–28; 279b13–14 and Plot. 3.7.5.31–33; 41–45.

75 See Leyden (1964) and, more recently, Chase (2011)—two useful and fuller studies of the development of the concept in antiquity (the former focusing more on Plato and Aristotle's conceptual schemas of eternity and the latter tracing its development in thinkers such as Proclus up to the last of the Neo-Platonists and early Christian philosophers such as Simplicius and Philoponus respectively).

ory, but that the idea of a Universe enduring for infinite Time is absurd, in the view of Epicureans such as himself. Velleius is correct insofar as the acolytes of Plato, from the Academy on to the Neo-Platonists, never doubted the everlasting duration of the generated Universe.[76] Time arose with the creation of the Heavens (37e), which Timaeus says is an image of moving eternity (37d) and is, therefore, also eternal itself, but in a *tempus* sense (this is highlighted by the crucial second element: the movement of Time κατ' ἀριθμὸν 'according to number'). However, a secondary question is whether Velleius' use of *aeternae* here is, in fact, in the same sense as Plato's αἰών? The *TLL* lists two primary semantic senses for *aeternus*: 'de rebus humanis quae aevum sed (usque ad finem vitae) tempus habent' (1.1420.39) and 'de deo, mundo, sim., quae per tempus (quod ad hominibus humanis)' (1.1420.72). In this latter sense, we find the notion of a duration of a lifecycle; an 'age' or 'eon' in English. Varro himself gives the etymology of the cognate *aevum* (fr. 311): 'Aevum ab aetate omnium annorum; hinc aeviternum. Graeci αἰῶνα, id dicit Chrysippus ἀεὶ ὄν' ['Eternity' comes from the duration [*aetate*] of all years; thence *aevum* which became *aeternum* [eternal]; the Greeks call it αἰών, which Chrysippus says is ἀεὶ ὄν.'[77] This 'eternity' is durational and hence temporal; simply the everlastingness of the age of the Universe, it endures through infinite Time (the 'duration of all years') and is apt to describe Plato's notion of Time in the physical Universe. If Cicero similarly understood *aeternae*, then we have a paradoxical situation: Cicero construed Plato's creation of temporality correctly in the *De Natura* as outlined *durum* in Velleius' attack and his synonymous use of *aeternae* and *assumpsit*, but *aeternum* (if we follow the views of those scholars outlined above) Cicero erred in the near-contemporary translation of *Ti.* 29b by referring to the Universe as a *simulacrum aeternum*.

Another question arises: Can we point to earlier instances of Cicero's understanding of Time in a similarly conflated sense? Namely, did Cicero's earlier usages of *aeternae* in his rhetorical works influence the meaning in his use of the noun in translating the Platonic concepts of ἀίδιον/αἰώνιον in the *Timaeus*? In the *De Inv.* 1.38, Cicero writes: *tempus autem est —id quo nam ipsum quidem generaliter definire difficile, cum alicuius, ut in rationibus, ut in curriculis spatium*. 'But *certa*

76 See CHASE (2011), 128–130, specifically his summary at 128: 'The model (Greek *paradeigma*), according to Plato, was characterized by eternal everlastingness (*tên aiônion aiotêta*), and so the Demiurge provided the world with temporal everlastingness (*tên khronikên*) by bestowing it upon it time, as an image of eternity.'

77 Cf. also Arist. Cael. 279a28–29.

تستقبلروافد من الفقرات والغدة الدرقية والجدار الصدري العلويوالثدي، ثم تتقارب لتشكيل الوريد التالي.

3.ال**الوريد الأجوف العلوي (SVC)**يتكون من اتحاد الوريدين العضدي الرأسيالأيمن والأيسر. ويمتد إلى الأسفل لمسافة 7 سم تقريباً ويصبفي الأذين الأيمن للقلب.
رافدهالرئيسي هو*الوريد الفردي*.يصُرف هذا الجهاز الدم من جميع التراكيبالواقعة فوق الحجاب الحاجز باستثناء الدورة الدموية الرئويةوالدورة الدموية التاجية. كما يستقبل تصريفاً من تجويف البطنعبر الجهاز الوريدي الفردي، الذي سيتم وصفه لاحقاً.

نظامالأزيغوس

يتمتصريف الدم الوريدي الرئيسي للأعضاء الصدرية عن طريق*نظام الزبيبالفردي*(الوريد الأبرز في هذا النظام هو .)الشكل 20.33(ih-goss-AZ)**أزيغوس**[18]**الوريد**،يصعد هذا الشريان على الجانب الأيمن من الجدار الصدريالخلفي، وقد سمُيّ بهذا الاسم لعدم وجود شريان مماثل له على الجانبالأيسر. ويستقبل الروافد التالية، ثم يصب في الوريد الأجوف العلويعند مستوى الفقرة الصدرية الرابعة (T4).

1.الحق**الوريد القطني الصاعد**يصُرف الدم من جدار البطن الأيمن، ثم يخترقالحجاب الحاجز ويدخل التجويف الصدري. يبدأ الوريد الفردي عند نقطةالتقاء الوريد القطني الصاعد الأيمن مع الوريد القطني الصاعد الأيمن.**الوريد تحت الضلعي**أسفل الضلع الثاني عشر.

2.اليمين**الأوردة الوربية الخلفية**تصُرف الأوردة الضلعية من المسافاتبين الأضلاع. يصب الوريد الأول (العلوي) في الوريد العضديالرأسي الأيمن؛ ويتحد الوريدان الوربيان الثاني والثالث لتشكيل... *الوريد الوربي العلوي الأيمن*قبل أن تصب في الوريد الفردي؛وتدخل الأوردة الوربية من 4 إلى 11 الوريد الفردي بشكل منفصل.

3.اليمين**المريء، المنصف، التامور،و**الأوردة القصبية((غير موضحة في الرسم التوضيحي) تصرف أعضائها المعنية في الوريد الفردي.

4.ال**نصف فردي**[19]**وريد**يصعد الوريد نصف الفردي على الجدار الصدري الخلفيالأيسر. ويبدأ من حيث يلتقي الوريد القطني الصاعد الأيسر، بعداختراقه الحجاب الحاجز، بالوريد تحت الضلعي أسفل الضلع الثانيعشر. ثم يستقبل الوريد نصف الفردي الأوردة الوربية الخلفية الثلاثةالسفلية، وأوردة المريء، وأوردة المنصف. عند يسار الفقرة الصدريةالتاسعة (T9)، يعبر إلى اليمين ويصب في الوريد الفردي.

5.ال**الوريد نصف الفردي الإضافي**ينزل هذا الوريد على الجدار الصدريالخلفي الأيسر. ويتلقى تصريفاً دموياً من الأوردة الوربية الخلفيةمن 4 إلى 8، وأحياناً من الأوردة القصبية اليسرى. ويعبر إلى اليمينعند مستوى الفقرة الصدرية الثامنة (T8) ويصب في الوريد الفردي.

الأوردةالوربية الخلفية اليسرى من 1 إلى 3 هي الوحيدة في هذا الجانبالتي لا تصب في النهاية في الوريد الفردي. عادةً ما يصب الوريد الأولمباشرةً في الوريد العضدي الرأسي الأيسر. أما الوريدان الثاني والثالثفيتحدان لتشكيل...*الوريد الوربي العلوي الأيسر*، والذي يصب في الوريدالعضدي الرأسي الأيسر.

[18]غير مزدوج؛ من*أ*=بدون؛*زيجو*=الاتحاد يا رفيق
[19]*نصف*=نصف

شرايينمنطقتي البطن والحوض f 20.7

بعدمرور الشريان الأورطي عبر الفتحة الأورطية، ينزل عبر تجويف البطن وينتهيعند مستوى الفقرة القطنية الرابعة (L4)، حيث يتفرع إلى الشريانينالحرقفيين الأصليين الأيمن والأيسر. ويقع الشريان الأورطي البطنيخلف الصفاق.

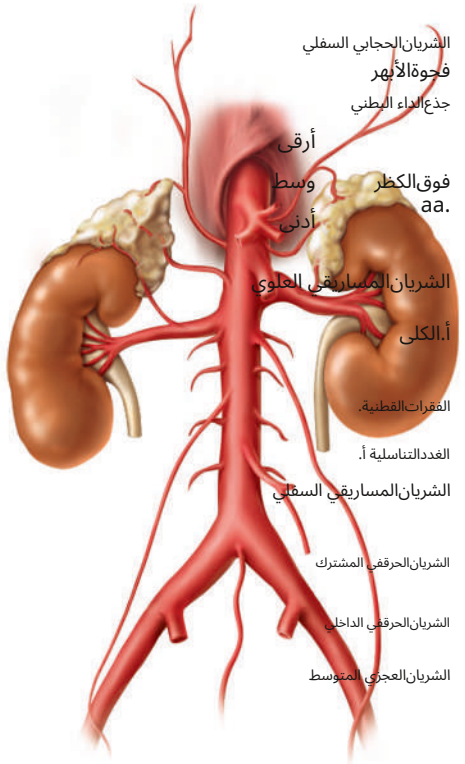
الفروعالرئيسية للشريان الأورطي البطني

يتفرعالشريان الأورطي البطني من الشرايين بالترتيب المذكور هنا، من الأعلىإلى الأسفل.(**الشكل 20.34**).تلك التي سميت بصيغة الجمع تكون مزدوجةيسار ويمين، بينما تلك التي سميت بصيغة المفرد تكون شرايين متوسطةمنفردة.

1.ال**الشرايين الحجابية السفلية**تغُذي هذه الشرايين السطح السفلي للحجابالحاجز. وقد تنشأ من الأبهر أو الجذع البطني أو الشريان الكلوي. ويصدركل شريان منها اثنين أو ثلاثة شرايين صغيرة. **الشرايين فوق الكلويةالعلوية**إلى الغدة الكظرية (فوق الكظرية) الموجودة على نفس الجانب.

2.الـ**مرض السيلياك**[20]**صنُدوُق**(.يغذي الأحشاء البطنية العلوية (انظر القسمالتالي))SEE-lee-ac(

3.ال**الشريان المساريقي العلوي**يغذي الأمعاء.



الشكل20.34الشريان الأورطي البطني وفروعه الرئيسية.

[20]*سيلي*=البطن، البطن

tries to increase the accuracy of his translation, hence the periphrasis with additional nouns to reinforce the Greek sense to his readers.[134]

20 **(*Ti.* 34b): vestivit extrinsecus caeloque solivago volubili** Cicero here introduces the adjectival compound *solivagus* 'lone-wandering' as a translation of Plato's ἔρημος. The Greek term is not morphologically complex and so Cicero is required to source a Latin equivalent without resorting to calquing.[135] Instead, he chooses the poetic practice of compounding. This term had been used earlier in Cicero's *De re p.*, *Tusculanae*, *De sputa* Similar poetic compounds can be found in *monti* (*DRN* 4.405, 2.597, 2.1081; Cic. *Tus.* 5.79),[136] *multi* (Stat. *Theb.* 4.499; Sen. *Her. f.* 533), *fluctivag* (Stat. *Theb.* 1.271, 9.305, 9.360, *Si.* 2.1.95, 3.1.84), *perv* (*Ovg Aur* 2.18), *omnivag* (Cic. *Nat.* 2.68), and *harenifer* (Lucan 9.944).[137] In the case of *multivag*, the adjective appears to correspond to the Greek adjective πολυπλανής and *monti* with μόνος; however, here Cicero is translating only ἔρημος, which lacks the -πλανής element, so the adjective functions as a poetic embellishment of the original Greek.

2.1.5 Materia and the 'Mean'

21 (*Ti.* 35a): ex ea materia quae individua est [...] gignitur tertium materiae genus In *Timaeus*, Cicero approaches one of the most complex elements of Platonic ontology: the creation of the Universal Soul, ontologically prior to the body of the Universe but not temporally, as Plato makes explicit, (see TAYLOR [1928, 105]). MÜLLER (1964, 110) notes that, in this section of the narrative (35a–36d), Cicero stays closer to Plato's original text than anywhere else in his translation because of the complexity of details and language involved in the account of the creation of the Soul. In Timaeus' story, this Soul is composed of a compound of two essences or beings (οὐσίαι): that which is of the Same and that which is of the Other or Different.[138] So Cicero's version tells us that

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134 Almost as a commentator instead of a translator, see SEELE (1995), 35: 'Die Übersetzung eines griechischen Begriffes durch eine paraphrasierend—erklärende Wendung, wobei der Übersetzer sich implizit als Kommentator betätigt.'

135 The term would later become a loan-word in Latin *eremus* would sometimes be rendered by *desertus* or *solitudo*, e.g. in Evagrius' translation of the *Vita Antonii*, see further GRAY (2015), 148.

136 For possible (though very few) lexical and broader textual connections between Lucretius and Cicero (specifically the neologism *monti*), see PAZZANI (1984), esp. 187.

137 Note *ludi* (Cassiod. *In ps.* 1.4 [6] *lu.* 351) was later used to mean simply 'sportive' (see LEWIS AND SHORT, s.v.) but this is the only example where the *vag* element has disappeared semantically.

138 Plato's other late period dialogue the *Sophist* (236d–264b, esp. 255c–d) is a useful comparison to this dichotomy of Sameness and Difference as 'beings' or 'kinds'.

the Soul was fashioned *ex ea materia quae individua et indivisa et quae circa res eodem modo se habet* (ἐκ τῆς περὶ τὰ ἀμερίστως καὶ ἀεὶ κατὰ ταὐτὰ ἐχούσης οὐσίας). The difficulty with οὐσία appears again, here referring to the indivisible 'Sameness' element that possesses the eternally unchanging essence or being, which Cicero re-interprets into 'stuff' (*materia*) which has 'always of a single kind (*modo*), as similar to itself.' This is not, conceptually, the same as Plato's meaning.[139] As discussed above regarding Lucretius' use of *materia* for Epicurean ἄτομος, the etymology of *materia* goes back to the fundamental sense of any 'substance of which a physical object is made or composed' (*OLD*). This is one of the many semantic personas of the enigmatic οὐσία (as noted in NAILS' taxonomy above in 1 and 2: 'property' or 'substance'), but here Plato's usage has been viewed as more ontologically fundamental than mere physical presence; rather, it is the 'essence' or primary being-ness of the eternal Exemplar. Cicero earlier rendered οὐσία with *aeternitas* but now with *materia*, why? MORENO HERNÁNDEZ (1994, 414) suggests two possibilities: the previous integration of the term into Cicero's philosophical vocabulary (e.g. in the *Academica* books) and hence its semantic extension to cover the sense in Timaeus' discussion of the Universal Soul;[140] and a contamination of Plato's metaphysics with Aristotelian thought, characteristic of Hellenistic-era Eclecticism. Another explanation might be the new metaphorical framework within which Plato has set up this origin story of the Universal Soul. Plato's metaphor for the admixture of essences in creating the Universal Soul is the κρατήρ (as we shall discuss in *T*.*i*41d below, see also TAYLOR [1928, 106]), within which the Same and Different essences are compounded, as if by a chemist, into a new one: the Soul. Since the Platonic vehicle for this metaphor was concrete and recognizable, i.e. the 'mixing bowl' of the symposium, what was Cicero to do? As we will see, he chose to abstractize Plato's κρατήρ with *temperatio*. The metaphor is now encased, so to speak, by the verbal abstract denoting 'a proper combination, mixture'. The ingredients, unlike Plato, who chose to abstractize them, are made more concrete in Cicero. He had followed the Platonic metaphor at the beginning of the Creator of the Universe as an *aedificator* (or 'demiurge'), fashioning the cosmos out of certain elements. *Materia* had also carried the much older sense of 'raw materials' of a builder, hence *TLL* s. v., IIA (8.745.76–*i*a

139 HERMANN (1842), 171 sees the conflation of 'matter' via *materia* with Plato's οὐσία as a grave error on Cicero's part, however see LAMBARDI's (1982, 138 f.) helpful counter-argument. Cf. also comments in MÜLLER (1964), 111.

140 In the *Academica* books however, the discussion is about the *materia* by which the demiurge created the Universe (a sense used later in Apuleius in the specific application to the unformed 'space' or the 'receptacle' in *T*.*i*.52bf.). Cf. specifically *Ac*. 27–28 and *T*.*i*.51a.

77): '*de qualibet substantia duabus substantiis materiis effici*' *ed ifi* Instead of an οὐσία of Sameness and one of Difference, Cicero introduces two *materiae* or 'material essences': one which is of an identical nature (*eius dem nat*) and the second is of the Other, difference (*alt*). Even if Cicero believed the Soul was of a divine, non-physical and immortal essence,[141] or simply suspended judgement on the topic, the (significant) semantic shift of *mat* to convey this sense of the Creator's ontological 'materials' shifts the conceptualization of Plato's οὐσία. Though the shift towards 'substance' as a criterion for 'being' or 'essence' had taken place already under the Peripatetic school through Aristotle's metaphysics, the Latinization of Plato's expression in this way accelerates the interpretations of 'essence' or 'being' as not simply tied to noetic Forms or Ideas, but material 'stuff', i.e. *subst*. Whereas Aristotle extended the notion that Forms and physical things possessed a primary 'substance', Cicero here imbues the notion of Plato's primordial 'Being' with a property, although metaphorical, associated with spatio-temporality, as the etymology of *mat* had consistently conveyed in Latin.

Seneca would later pass comment on Cicero's vocabulary in translating Platonic metaphysics. For instance, in *Ep* 58.6 (discussed above). There is, as far as we can discern, no direct evidence beyond *test* that Cicero used the word *ess* for οὐσία (see discussion in Chapter 5). 'How otherwise can we find a word for that which the Greeks call οὐσία, something that is indispensable, something that is the natural substratum of everything? I beg you accordingly to allow me to use this word,' Seneca wrote.[142] The apparent desperation here for an equivalent to the Greek term is palpable in Roman authors. As previously discussed at the beginning of this commentary, since Latin appeared to have no mechanism within its lexicon or grammar to translate technical concepts such as τὸ ὄν or οὐσία effectively, we find Roman authors grappling with this by various means. Either they attempt a conceptual reinterpretation (Cicero's *materia* for a οὐσία) or use a literal calque (Seneca, Apuleius, and Calcidius' *ess*), *nti a* or they prefer a change of grammatical form entirely (*quod* τὸ ὄν) and this alters the concepts Plato used in the original Greek.[143]

22 (*Ti.* 35a): fugientem et eius copulationis alienam Cicero employs the verbal abstract *copu* to render the Greek συναρμόττων from συναρμόζω 'to fit together' and seems to translate the adjective δύσμεικτος 'difficult to mix' with

141 See e.g. *Tusc*. 1.24; but see also the character of Cato in *Sen*. 85.

142 *Ep* 58.6: *quo modo autem hoc licebit mihi enuntiare quod tu essentiam uocas? Fundamentum rogo itaque petimus ut mihi hoc verbo uti*

143 Cf. Poncelet (1957), 92–94 for his critique of Cicero's rendering of *Ti*. 37b which centres around the concepts of τὸ γιγνόμενον and ἔχοντος ἀεί.

a double translation. The term *copula* is replaced later in translations such as Calcidius' with *conclusio* but had been used earlier by Cicero in his discussion of Epicurus' 'swerve' and the cohesion of atoms with other atoms as a result in *De Finibus*: *ibi tuas effici complexiones et copulationes atomorum*. The noun is also used in a section from the *De Natura Deorum* (2.119) in a similar context where Balbus the Stoic marvels at the providential cohesion of the Universe: *quae copulatio rerum et quasi conmixtio et tam varia coagmentatio, nisi divino quodam et sempiterno inligata consilio?* and *reputavisse certo scio*.

23 (*Ti.* 36a): ut in singulis essent bina media—vix enim audeo dicere medietates, quas Graeci mesotetas appellant Cicero here provides us with one of the most insightful examples of his rhetorical skills as applied to the translation of Greek philosophical terms. As noted at the outset of this book, the question of whether Latin authors sought to transform Greek philosophical expressions by creating a new vocabulary within Latin or whether this transformation was a natural consequence of the translation process, is at the centre of this study. Roman figures such as Cicero and Caesar were 'purists' when it came to their mother tongue and would admit few direct Greek loan-words for fear of sounding alien or obscure, or (perhaps worse) 'too Greek'. Cicero, therefore, used a variety of techniques, as we have witnessed so far throughout this translation alone, to carefully bring in new words or meanings into the Latin language. Some of these techniques include periphrasis, circumlocution, and double translation, others include semantic augmentation or metaphorical speech and in the present instance we see him coining a new word outright, but with seeming hesitation and serious qualification. I suggest that this hesitation was a rhetorical move, a type of *captatio benevolentiae* and (as we will discuss below) a form of *praeteritio*, 'the announcement of the intention to leave certain things implies the mentioning of these things'.[144] If Cicero were satisfied that a simple gloss here would suffice, he might have proceeded without hindrance. Instead, he goes out of his way to make a point: 'For **I would not dare** to say *medi*,[145] which the Greeks call μεσότης, but let it be understood as if I had said it thus, for it will be **more clear.**' While Cicero says he would not 'dare' to use a neologism here, he does anyway because 'it will be clearer'. Here, we see the rhetorician at work, with indirection and sleight-of-hand to provide the reader with novel Latin vocabulary using Cicero's trademark *praeteritio*.[146] *Veritio*

144 See Lausberg (1960/1998), § 882 f.

145 See also the discussion in Wölfflin (1886), 458–470, especially 459, for a diachronic analysis of the term from Cicero onwards.

146 Cf. van den Berg's (2021, 244) observation characterizing the aims of Cicero's *Brutus*-dialogue: 'Indirection is its lifeblood.'

In other words: 'I would not dare employ a new word such as *mediatates* in our mother tongue, fellow Romans, but let us pretend this was a word and that it may denote the same as the Greeks' μεσότης, so that our meaning can be clearer.' Cicero's polite expressions, (what CLAVEL [1868, 281] first called the 'quasi excusatio'), demonstrate that coining new terms and introducing them *ad hinc* into his translation at this stage of the *Timaeus* was not just a linguistic concern but an acceptability one as well, skirting close to the edge of good Latin literary form and style. Cicero turns here—as a Shakespearean aside, clarifying the actions of a character on stage during the performance—to gently elucidate these difficult concepts by dropping innovations in his translation qualified with polite language and expressions for the benefit of his Latin audience. Cicero admits that μεσότητες can be translated as *binae mediae* or 'two middles' but the word he prefers (although he would not dare to force it upon his educated Roman readers) is the morphological calque *mediates* because *ita* is 'more clear'—but this is only his opinion. His translation was by no means a private hobby or a pastime for him with which he could amuse himself. The preface, with its conspicuous lack of reference to Plato, combined with the asides to his readers in areas where he is forced to innovate in Latin, suggests the text was tailored for a wider Latin reading audience. Cicero, in his translation, could have freely glossed his way through Plato's dialogue but there is a glimpse throughout the text of an author who set his task as one in which his vocabulary would become productive, who made the effort to introduce vocabulary that could equal the technical abstractions of the Greeks, but that could also be understood by a Latin-speaking audience not necessarily well-versed in Greek vocabulary. One might question whether Cicero intended such an innovation to become productive, for the elaborate way it was introduced here is somewhat anticlimactic with *mediates* not being used by Cicero again (unlike other terms such as *qualitates*, *formae*, *species*, etc.). A question that remains is why some terms were carefully introduced to his readers, then abandoned; others later used as if normal Latin words. It is difficult to answer this question without delving into psychologism, but we know this translation was done two years before his assassination in 43 BC and so the period for him to develop works in which terms such as *mediates* were required was limited. Secondly, there is a sense that Cicero might have been signalling or marking his lexical innovations for posterity. It is not simply a question of whether Cicero preferred to continue using these technical terms in his works (which often he did unless considerations of style weighed against it, e.g. *vertere*). Rather, he might have also kept in mind his readership and future authors of Latin philosophy, who might take up the terms in different contexts (which certainly took place in the case of *mediates* in post-Classical Latin).

2.1.6 Latin Mathematical Vocabulary in Cicero's Translation

23 (*Ti.* 36a): sequealteris autem intervallis et sequetertiis et sequeoctavis [...] omnia explebat Though mathematical (as opposed to philosophical) vocabulary is not strictly part of the ambit of this study, comment should be made on its appearance in Cicero's translation. He provides an array of Latin mathematical terms in this section unattested elsewhere in Latin, though intelligible,[147] and appear ostensibly to be morphological calques. They have the following values based on the numerals in Plato's original:[148]

s e s q u i + *a l t e r* = 1 ½ (ἡμιόλιος)
s e s q u i + *t e r t i* = 1 ⅓ (ἐπίτριτος)
s e s q u i + *o c t a v* = 1 ⅛ (ἐπόγδοος)

Cicero's translation runs as follows:

> *s e s q u i a l t e r i s a u t e m i n t e r v a l l i s e t s*
> *h i s c o n l i g a t i o n i b u s i n p r i m i s i n t e r v*
> *t i a o m n i a e x p l e b a t , c u m p a r t i c u l a m s*
> *p a r t i c u l a e i n t e r v a l l o r e l i c t o h a b e b*
> *p o r t i o n e m c o n p a r a t i o n e m q u e i n e x t r e*
> *g i n t a s e x c u m d u c e n t i s q u a d r a g i n t a t r*
>
> Then the one and a half (3:2) intervals (*i n t e*) and the one and a third (4:3) and the one and an eighth (9:8) were taken up and from these combinations He filled in all of the 4:3 interval with the first of the 9:8 intervals, with only a single fraction left over; then from the interval of this remaining fraction, a number that had the same comparison by portion in the extremes as 256:243.

The term *i n t e r* here as applied to the musical divisions by proportion seems to be echoed in the *D e N a t u r a* 2.146, where the discussion focuses on διαστήματα 'intervals' in the musical sense used by Plato (*R e. p* 531a). Cicero translates this with the terms *i n t e r v a l l a t i o* or *s i m p l e x i n t e r v a l l u m* three.[149] In the *T i m a* διάστημα is consistently translated as *i n t e r. v a l l u m*

147 Numerical terms using the prefix *s e s-* are relatively numerous from Plautus to Cato, Varro, Cicero, and Vitruvius into the Augustan and later Imperial periods.

148 For a discussion of the musical theory and geometric progressions associated with Timaeus' Pythagorean account, see CORNFORD (1937), 66–74; TAYLOR (1928), 136–148.

149 See PEASE (1958), 2.930 for its use in a periphrasis in the *N . . D a r i* had also appeared

The issue of whether Romans possessed a developed vocabulary or system of mathematics would be broached by Cicero in the later *Tusculanae Disputationes* work: 'Geometry was regarded with the utmost respect among the Greeks and thus none were held in greater honour than mathematicians. However, we Romans have limited this art to the practical purposes of measuring and calculating.'[150] This became the *locus communis* on Roman attitudes towards mathematics and modern scholarship has generally consigned it to irrelevancy, with dismissive statements such as KLINE's (1972, 178): 'Roman mathematics hardly warrants mention [...] in all of the eleven hundred years there was not one Roman mathematician; apart from a few details this fact in itself tells virtually the whole story of Roman mathematics.' CUOMO (2001, 194) wrote that it is difficult to adduce a Latin equivalent of Euclid, Archimedes, or Apollonius and HODGKIN (2005, 70) goes further in asking: '[W]here are the Latin equivalents of Heron or Nicomachus? True, these second- or third-rate mathematicians worked under Roman rule [...] However, they wrote in Greek and in a tradition which was and continued to be, overwhelmingly Greek.' Though a theoretical system of pure mathematics is absent in Roman authors, there are multiple examples from inscriptional evidence, with the practice of applied mathematics seemingly part of everyday life in Rome; for example, when it came to recording magnitudes of success in competitions.[151] The Romans also maintained a rudimentary form of arithmetic and geometry and the principal use of mathematics was in land surveying.[152] Roman surveyors organized as a profession in which a discipline was transmitted via textbooks over generations which, as HODGKIN notes, 'both explained how they did it and wrote instructions whose foundation is in their training in some derivative of Euclidean geo-

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in Varro and Caesar, *inter* in Lucretius (referring to the more general sense in e.g. Democritus and Epicurus' διαστήματα of 'distance'). *Dist* appears first in Cicero (*Inv* 1.75), later productive in Seneca and Pliny the Elder, *inter.* In the *Tiim* Cicero first uses the term to render the Greek gerundive διοριστέον 'one must distinguish' (*Ti.* 29b), which the *OLD* defines as a new meaning: '4b. an axiom' but the *TLL* does not (5.1.1519.52–53). I have not classified it as a new meaning.

150 *Tu.* 1.5: *in summo apud illos, ihtoanqourenginehoimlemmatitlaefmuaittiatnos metiendi ratiocinandique.* Cf. also *Fin.* 5.7, where Cicero has Pupius Piso say: *ut ad minom, mautvheen, pin autem, in mausic, ici medici denique ex hac tamquam om,* with which the character of Cicero agrees: *atqu's eig'so mq, tiasmtudid, Pin.* See also HÖSLE (2008), 157: '[M]athematical activity is for [Cicero] axiologically inferior to politics—something Plato would hardly have accepted.'

151 See e.g. an inscription cited by CUOMO (2001, 150) from *CIL* 6.10048 (Rome, 146 AD).

152 See for example the *Corpus Agrimens* (a fifth-sixth century AD) *orum*

metry'.[153] KLINE (1972, 179) suggests it was from approximately 50 BC onwards that Romans first began to write mathematics or geometry textbooks adapted from Greek sources. Vitruvius' ten books, known as *De Architectura*, written in 14 BC and replete with architectural, mechanical, and mathematical terminology, are our only source of much of this type of technical terminology in Latin and commanded significant influence into the Middle Ages and Renaissance—Leon Battista Alberti, Leonardo da Vinci, and Michelangelo all knew of his work. With Vitruvius exempted however, the mathematical vocabulary from Cicero's time is exiguous, beyond basic arithmetic and Greek-influenced geometry, and it was not until the (now lost) translations of Euclid's geometry and Ptolemy's astronomy by Boethius (according to Cassiodorus) that Latin authors attempted to grapple with the mathematical theory of the Greeks in any substantive way.[154] Even in antiquity, Aulus Gellius had noted in the second century AD that Latin had no individual equivalents for Greek mathematical terms such as ἡμιόλιος and ἐπίτριτος (evidently not aware of Cicero's translations of these terms, or terms such as *sesquialter* in Quintilian and Pliny the Younger) and that creating new terms to correspond to the Greek ones would be 'absurd'.[155]

The issue is one of more general interest, namely the relevance of a civilization's success or failure in formulating a language to discuss the ideas of mathematics and geometry at an abstract level. Cicero had seen the need for a philosophical vocabulary in Latin to compete with and surpass the Greeks' dominance in the field but appeared to have no pressing need for mathematical terms as a specialized jargon (pure mathematics). The subjects that mathematicians such as Euclid or Eratosthenes spent their time studying were not the same as those which interested the educated elites of Rome. The latter included Lucretius and Cicero, who dedicated their leisure to philosophical problems rather than technical handbooks. Later figures such as Vitruvius, certainly less elite in status but who would exert significant influence on later thinkers, saw mathematics as a noble intellectual pursuit in its application to real-world practices (e.g. *De Architectura* 1.1.4). KLINE (1972, 179) argues the Romans 'boasted of their practicality' and that they did not understand 'pure science',

153 HODGKIN (2005), 70.

154 Boethius did compose mathematical works of other kinds, which have survived to posterity, e.g. *De Musica*. See further EVANS (1976), 105–118; ZAITSEV (1999), 523–525.

155 Gell. 18.14.1–4: *figurae quae διάμετροι et συμμετρίαι et alia huiuscemodi ad rem pertinentia, vocabula in lingua Latina non habent. sed quidem existimaverunt, fingere autem nostra, quoniam id absurdum videretur "proles" et "soboles" et "suboles" et "progenies" dicere*. See also ALIZON-MOREL AND LECAUDÉ (2016), 592–593.

concluding that '[t]heir failure to develop mathematics is striking'. Nevertheless, this might be to miss the point that e.g. CUOMO (2001, 201–202) raises, namely the false dichotomy between 'Greek versus Roman' and 'pure versus applied' branches of mathematics. Some educated Romans, in the tradition of Plato, had theoretical uses for mathematics which were socio-political and, therefore, ethical in nature.[156] Others, such as Vitruvius, saw a blend of theory and practice as indispensable, as he frequently reminds the reader that his training is both literary and technical and being a good architect requires sound technical knowledge, reliability, and loyalty, i.e. a moral character based in experience and understanding (see e.g. Vitruvius, 6. *p r a* 6-*e* 7). The various roles played by mathematics in Roman intellectual and technical spheres was therefore not always straightforward or clearly systematized. However, what can be said is that the emergence of any 'pure mathematics' as a systematized body of knowledge never developed in Rome in the same way as it had in Ancient Greece. It is sufficient to note for this study that Cicero had at least some interest in translating the Pythagorean[157] mathematics of Plato's *T i m a e u s* into Latin for the first time in Latin (that we know of). He did so in a context where, (as observed with *m e d i*), he was aware of the need for technical terminology to convey the abstract philosophical concepts in Greek. Nevertheless, he was required to proceed with caution in case his expression became burdened by too many unfamiliar technical terms in Latin.

24 (*Ti.* 36b) mediamque accomodans ⟨ad⟩ mediam quasi decusavit At *T i m a* 24, we find the first-attested verb *d e c u* (*OLD s. v.* 'arrange *c u s s o* crosswise; to make with a cross') based on the older *d e c u*. Cicero reuses this verb to translate the Greek noun for the letter X or χεῖ (*T i.* 36b: οἷον χεῖ προσβαλὼν). The Latin verb is later used in the first century AD by Columella (*D e R e R u s* 3.13.12). Vitruvius seems to have used the abstract noun *d e c u s s a t i* later and adverbially in *d e c u s*. In Christian inscriptions from Rome circa the third century AD, one finds the participial form *d e c u s* in a common phrase (e.g. *m o n o g r a m m a C h r*),[158] though in one inscription *s t u m* predating Cicero. Whereas Plato's image is of the letter, Cicero's is Latinized,

156 E.g. CUOMO (2001), 201: '[M]athematics gave upper-class Romans and Greeks a way of articulating their positions about the state and the individual, power and knowledge.' See e.g. Cic. *R e.* 1.16 where the character Tubero links Plato's Pythagorean use of mathematics and geometry to questions of politics and ethics.

157 Cicero's interest in the Pythagorean influence on Platonism is not limited to the *T i m a e u s* see also his doctrine of music and spheres in the *S o m n i u m S* section of the *R e.* See also RAWSON (1975/1983), 235 and HÖSLE (2008), 146 n. 6.

158 See for example *I C V I R*, 20598.m; *I C V I R*, 20406 http://www.edb.uniba.it/epigraph/41458.

referencing the numeral *d e c* or *x* in Roman numerals.[159] The construction *c o n c r e t u m a t* provides an alliterative effect in the double translation, which we can compare with examples such as *c o m m e n d a r e e t c o n* in *P r o P . Q u i n c t .* 62 and *P r o t o i S a u B . o s c i o* 113.

26 (*Ti.* 36b–c): animum [...] quom ille procreator mundi deus ex suae mente et voluntate genuisset The translation of *T i .* 36b: ἐπεὶ δὲ κατὰ νοῦν τῷ συνιστάντι πᾶσα ἡ τῆς ψυχῆς σύστασις ἐγεγένητο gives an example of Cicero avoiding the introduction of a direct equivalent for the abstract noun σύστασις, which is only later translated in a different context by Victorinus with the morphological calque *c o n s i .* Instead, he expands with pleonasms, *e x s u a e m e n t e e t* (κατὰ νοῦν) and *p r o c r e a t o* (τῷ συνιστάντι) and *d e u s* replaces Plato's objective genitive πᾶσα ἡ τῆς ψυχῆς σύστασις 'the whole formation of the Soul' with the accusative *a n i m u m g . e n u i s s e t*

2.1.7 *A s p e c, c t o i n b c i, t e l e i t a s p e* and the Creator

26 (*Ti.* 36e): sic animus a medio profectus extremitatem caeli a suprema regione rotundo ambitu circumiecit The verb *c i r c i e c i t* is an idiosyncratic extension meaning 'to encompass, enclose', whose subject is *a n i m u s*, now rendering the Greek participle περικαλύψασα 'to surround'. The verb originally denoted 'to throw something around something' (cf. Caes. *C i .* 3.45.3). There are many similar instances of Cicero using Latin finite verbs to render Plato's participles (see HINTZEN [1993], 191–192).

27 (*Ti.* 36e): corpus quidem caeli ⟨a⟩spectabile effectum est, animus autem oculorum effugit optutum The adjective *a s p e c t a b i l i s* 'capable of being seen', introduced earlier in *T i m* 12 and 13, translates the Greek ὁρατός (*T L L s .*, 2.10.800.66). In this passage, it contrasts the visibility of the heavens with the invisibility of the Soul. Note, instead of simply coining an analogous privative adjective to render Plato's ἀόρατος, e.g. * *i n a s p e c t a b i l i s*, Cicero uses the figurative periphrasis *a n i m u s [n.] o c u l o r u m e f f u g i t o p t u t u m* making the meaning less literal and more active in sense: the Soul is not of a material which is invisible to the human eye but it 'escapes' (*e f f u g i o*) our gaze, adding dynamism

159 Whether it was spelt *d e c u s s i s* or *d e c u s s i t* is complicated by a corrector hand in one codex (V) adding a second *s* and various editions by HALM et al., BAITER and MÜLLER printing the double *s*. PLASBERG and GIOMINI print the verb with a single *s*, with which there seems no reason to disagree. See PLASBERG (1908), 174; PLASBERG AND AX (1938/1987), 169. Also see PEZZINI (2015), 228, 60: 'The simplification of internal *-ss-* is a phonological phenomenon attested in republican Latin, but generally after a long vowel or diphthong: cf. e.g. *c a u s a* < *c a u s s a* (thirty instances in CIL 1², cf. e.g. 583, 590, 592, 593, etc.), *q u a e q s u o a e n s a s s o n u s s u s d u i m* < *i d s i i v o i e t s*.' Note also the comments in Quint. *I n s t .* 7.10 discussing e.g. *c a u . s s a*

to the translation and contrasting the passiveness of the heavens, described with the *-bilis* adjective, with an image of the Soul as having a kind of agency. There are numerous other verbal adjectives Cicero coined or added new meanings to using this morpheme to map onto the Greek -τός.[160] Cicero turns to various techniques in his translation of the -τός suffix throughout the *Timaeus*:[161]

-bilis	*aspectabilis*	ὁρατός (31b)
-tus	*indissoluta*	ἄλυτα (41a)
adjectival expressions	*fugientem et*	δύσιμαντον (35a) *pulsationis alienam*
prepositional phrases	*caelum itaque*	συνεστήσατο οὐρανὸν ὁρατὸν καὶ *aspectum et tactum*	ἁπτόν (32b) *accidat*
posse	*solvi potest*	λυτόν (41a)
verb	*animus autem*	αὐτὴ δὲ ἀόρατος [...] ἡ ψυχή (36e) *effugit obtutum*
relative clause	*eorum quae*	ἐκ πῶν κατὰ φύσιν ὁρατῶν (30b) *entur*

The extensive *variatio* was therefore an integral aspect of Ciceronian translation in the *Timaeus*.[162] It notes also the translation of 32b with a technique of cognate terms being used for different purposes. The perfect passive *aptum est*, though cognate with the Greek ἁπτόν 'tangible', renders the aorist συνεστήσατο instead.

27 (*Ti.* 37a) **est autem unus ex omnibus rationis concentionisque, quae ἁρμονία Graece** Cicero's translation of Plato's ἁρμονία uses the *-tio* abstract-forming suffix to produce *concentio* and provides the musical connotations of this metaphor for 'harmony'. The *TLL* defines the term as deriving from *concino* '*simul canere*' (s.v., 400.82–402.48), whereas the Greek meaning (LSJ s.v. ἁρμονία, IV) can include notions of a musical scale, enharmonic scale, a musical mode, intonation or pitch of voices, among others. The musical metaphor of ἁρμονία applied to cosmological contexts seems to have been initially Pythagorean.[163]

160 *Comprehensibilis* (καταληπτός), *inidissolubilis* (ἄλυτος), *mobilitatis* (εὐκίνητος, στρεπόμενος), *opinabilis* (δοξαστός), *intractabilis* (ἀπτός). *Similis*

161 See JONES (1959), 33.

162 See also PONCELET (1957), 202–203; 353 f.

163 See Arist. *Cael.* 290b13, *Mu.* 399a12. Note TAYLOR (2020), 61–63 on the use of the metaphor in Lucretius' poetry.

quo nihil ab optimo et praestantissimo genitore melius procreatum In this periphrasis, Cicero provides another description of Timaeus' Creator. This translates Plato's abstract (*Ti.* 37a): ψυχή, τῶν νοητῶν ἀεί τε ὄντων ὑπὸ τοῦ ἀρίστου ἀρίστη γενομένη τῶν γεννηθέντων 'the Soul, having come into existence by the agency of the best of intelligible things[164] and existing eternally as the best of generated things.' Cicero seems to have read it in the same way, translating the Greek partitive genitive into an *a b* + ablative of quality construction and including his favoured rhetorical *n i h* + superlative phrasing.[165] Why Cicero then substitutes ὁ ἄριστος with *g e n* is unclear, but we might initially attribute it to the 'concretizing' nature of Cicero's Latin translation. Romans could use *o p t* 'best, ideal', frequently used to describe the best kind of 'man', 'idea', 'practice', 'age', etc., and often applied as an honorific title to gods directly (*O L D s . v . 9*, 7a), for example in Ennius: *o D i o, o n p y t s i e m* (*A n n .* 49 V) or in Accius: *t o t i p d a e t m a r* (*t r . t p .* 644 R), however, Cicero settles on a more anthropomorphic image to render Plato's ὁ ἄριστος. The notion of the *p a t e r o p t i m* may be conceptually closer to ὁ ἄριστος, although it still possesses the same anthropomorphizing issue as *g e n*,[166] which was to become a broader feature of Latin equivalents of Plato's cosmic demiurge.[167] TAYLOR notes parallels in Plato's text with Empedocles, echoed in a section from the *P h a e d r u s* (246c), and concludes: 'Both passages, like that in the text [of the *T i m*.], are protests against the traditional Greek conception of a god as just a being with an immortal *b o d y*'.[168] ARCHER-HIND suggests that 'it is very significant that the δημιουργός is identified with the object of reason, νοῦς with νοητόν. Here then we have another token that the δημιουργός is merely a mythological representative of universal νοῦς which evolves itself in the form of the κόσμος'. But these dimensions of Plato's δημιουργός are not reflected in Cicero's Latin.

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164 'Noetic things' to be understood here with the specific Platonic sense of things perceptible to the divine νοῦς.

165 The ablative of quality was common in Classical Latin, less so in 'Vulgar' and later Latin, see e.g. SYNT. 1.156–157. For particular examples of its use in Lucretius, see e.g. HIDÉN (1899), 47 f.

166 The word *g e n* is also poetic and figures in very similar honorific titles such as Acc. *t r .* 41: *g e n i t o r e m i n a* and in inscriptions, such as *CbI* I^{2} 14.18: RELIQVI FLETVM NATA GENITORI MEO.

167 This is not to critique Cicero's version as erroneously anthropomorphic compared with Plato's, certainly the latter instigated the metaphorical images of ὁ τεκταινόμενος and ὁ δημιουργός. Rather, it is the degree to which Cicero's version anthropomorphizes which is noteworthy; i.e., re-interpreting the more abstract Platonic labels for the primary cause of the Universe (τὸ αἴτιον, ὁ ἄριστος, ὁ συνιστάς, etc.) with more concrete Latin terms such as *g e n . i t o r*

168 TAYLOR (1928), 176.

eadem iunctus alteraque natura, adiuncta materia, temperatione trium partium This section outlines three key elements which the Demiurge combines (*T.* 37a: συγκεράννυμι): the Same (αὐτός, *id*), the Other (θάτερος, *alt*), *era* and Being or Substance (οὐσία, *mat*). Cicero's verbal substantive *temperatio* for συγκεράννυμι appears first in this translation defined as 'the mixing of substances in due proportion, blend, composition' (*OLD*, s.v.). As discussed above, in *Tim.* 28, the familiar Platonic terms δόξα and πίστις are rendered by *opinio* and *fides*. In the *Lucullus* (37), Cicero uses the latter as part of a double translation (with *adprobo*) to describe the Stoic concept of συγκατάθεσις. Plato's δόξα 'opinion' consists of man's εἰκασία 'conjecture' of the shadows of physical objects and his πίστις of these objects (*Resp.* 510a9; 511e).

28 (*Ti.* 37c, lacuna): set intellegentia continentur * [...] gaudio elatus [...] ratione igitur In the lacuna which follows, we find only glimpses of the equivalent section in Plato (ἄγαλμα [...] καὶ εὐφρανθεὶς etc.). We can speculate that Augustine, who had access to Plato's *Tim.* only through Latin translation, namely Cicero's,[169] knew of this section more fully than is preserved to us today due to his *testimonium* in *Civ.* 21.12: *eum Platonem qui dempserit aut omnes esse scilicet deum gaudium*. Testimony from the grammarians demonstrates that they had access to this section of Cicero's translation (29: *curris curriculumi*), as do Nonius,[170] Charisius,[171] and an unknown grammatical source.[172]

2.1.8 Lucifer, Cosmos, the Altrix, and Daimones

29 (*Ti.* 38d): lucifer deinde et sancta Mecuri In *Tim.* 29, Cicero renders Plato's Ἑωσφόρος 'lit. dawn-bringer' as found in *Il.* 23.226, Hes. *Th.* 381 and Pi. *I.* 4(3).24, with *luci fer*, found also in Accius' *Trag.* 339. It is also found in Varro (R. 3.17: *stella Luci fer et ut Graeci Phosphorus dicitur*). The citation *sancta Mercurii* 'sacred star of Mercury' renders τὸν ἱερὸν Ἑρμοῦ 'hallowed to Hermes'. Cicero's use of *lucifer* becomes an allusion to previous poets composing in epic, mimicking Plato's use of the Homeric Ἑωσφόρος. In the sense of *luci* as 'Morning

169 See COURCELLE (1948), 156–159 who argues (157) Augustine used only Cicero's version and not Calcidius' (though see other opinions cited at 157 n. 10); HAGENDAHL (1967), 535: 'There is no reason for believing that Augustine ever read [Plato's] *Tim.*, any more than Plato's other works.' See recently HOENIG (2018), 215–279.

170 Non. p. 198: *curriculum neutro genere Cicero Timaeo: et ut ego existimo [scribendum] curriculum invento est solis et lu*

171 *Gramm.* 1.77.12K: *curriculus masculino, in eo tractat Ciceronis interpretes veteres et recentes spatium ad currendum aptum. Cicero Timaeo: curriculum*

172 KEIL (1857–1870/2009), 5.576.3 'de dubiis nominibus': *curriculus generis masculini diminutive curriculus. nam Cicero curriculos*

Star', Cicero's usage is first attested and he explicitly glosses this later in the *De Natura Deorum*: *iovis fulmma est quinque errantium terr, quis Φωσφόρος Graece Lucifer Latine dicitur* term Φωσφόρος seems to be more astrological (attested as an adjective in, e.g., Aratus) and is only found as a substantive in the pseudepigraphon entitled Περὶ φύσιος κόσμω καὶ ψυχᾶς (c. 1 BC–1 AD) falsely attributed to Timaeus of Locri.[173] It is also found in the Ps.-Aristotle *Mu.* 392a27 and 399a8 (LSJ s.v. φώσφορος Ab). In the *De Natura* Cicero glosses the astrological substantive for Venus with *lucifer* as he translated Ἑωσφόρος (attested largely in epic poetry) with the same. Similarly in the same work (2.53), Cicero glosses the 'Star of Mercury': *infra hanc autem* (*est Στίλβων ille apud Graecos*) *Mercurii stella* (*c*). The Greek term varies from the periphrasis used in the *Tim.* (τὸ ἱερὸν Ἑρμοῦ) and is only attested again in the Pseudo-Aristotelian *Mu.* 392a26, then later in the astronomer Eudoxus (*Ar.* 5.10). We can conclude that the Greek that Cicero translates in the *De Natura* is more specific to astrological vocabulary than in the *Tim.*, which is freer in its sense, corresponding to the poetic description in Plato.

34 (*Ti.* 40a): ad volubilitatem rotundavit The image of 'making round' the stars and planets (what Timaeus calls the divine race) is conveyed in Latin with the verb *rotundare* first found here in Cicero, translating εὔκυκλον ἐποίει, and again not long afterwards in Vitruvius (10.11.1), who discusses the design of a water pump device. It is not likely to have been a Ciceronian original and seems to be a more general description for an action of 'rounding', later applied to calculation, e.g. 'rounding off' a sum of money (Hor. *Ep.* 1.6.34).

35 (*Ti.* 40a): divinae animationis maxime speciem faciebat ex igne The abstract *animatio* in section 35 refers to what Plato called the θεῖος or 'divine class' of beings. The Greek term is an adjective acting in an abstract substantive sense: τὸ θεῖον and Cicero uses the pleonasm: *divina natura*, the second *natio* element, it seems, being a noun coined by Cicero to convey the abstract sense in Plato's θεῖος. The term is later picked up in Tertullian to render ἐνθύμησις (*Adv. Val.* 9.4: *via de est animatione cum Platonis nuncupatum*) with a different sense, i.e. of a 'stirring' or animation rather than an abstract 'being'.[174]

35–36 (*Ti.* 40b): ut hunc varietate distinctum bene Graeci κόσμον, nos lucentem mundum nominaremus The translation of the Greek κόσμος with the phrase *lucens mundus* first found in Cicero and later in Vitruvius (e.g.

173 See Ulacco and Opsomer (2014), 155.

174 See also *Anim.* 19 and *Adv. Marc.* 3.3. Cf. Macrobius *Somn.* 2.12.8: *ipsum mortem animae discessum animationis*

1.5: *horum enim deorum et species et effect*
praesentit). Cicero is consistent when he translates the Greek κόσμος with *mundus*.[175] He then continues, translating τὰς δὲ πέντε κινήσεις ἀκίνητον καὶ ἑστός, ἵνα ὅτι μάλιστα αὐτῶν ἕκαστον γένοιτο ὡς ἄριστον '[...] but the other five motions were at rest and standing still, so that each of them could become the best possible' with *quinque autem remotis [...] iis quae minime solitae moveri stare*. Three manuscripts have *orbe*, though HALM prints *orbis*, as does PLASBERG AND AX (1938/1987, 176), which fits the Greek more closely than the former (τὰς δὲ πέντε κινήσεις ἀκίνητον). Cicero's translation conveys the sense of the original, with some superfluity, adding that the Creator wished the remaining five divinities (i.e. heavenly bodies) to be deprived and bereft of motion (*motibus orbum*) so that they would be *permanere in eadem stat*
There are other reasons to discount *orbe*: Cicero's *orbis* corresponds to κύκλος consistently, which is not found in this section of Plato's work.

37 (*Ti.* 40b): **terram altricem nostram** The feminine agent noun *altrix*, referring to Earth, is poetic, found in Cicero's *Prognosticon* and earlier, according to Varro, in Pacuvius (*L.* 7.18).[176] It translates τροφός 'nourisher', which is always feminine in Homer (e.g. in the sense of a 'nurse' in *Od.* 2.361) but masculine in tragedians such as Euripides. Here it is also feminine in Plato, agreeing with ἡμετέρα (*Ti.* 40b–c): γῆν δὲ τροφὸν μὲν ἡμετέραν 'our nourisher the Earth.' The other nouns in this section, φύλαξ 'guard' and δημιουργός 'creator', are rendered with *custos* and *opifex*. The latter is an agent noun favoured by Cicero that only occurs elsewhere in the *De Fin.* 1.67 and *Tusc.* 1.87 and *De Div.* 2.124 (*TLL s. v.*, 5.2.1298.63–64). The occurrences in the *De Fin.* are not couched in deistic language but seem to be used for effect to add a lofty tone to the diction of the imagery. In the *De Div.*, written in after the *Timaeus* we see Cicero's reference as more theological (*vi mentis sedes divina nam effi*
nitur). If we postulate that both books of the *De Fin.* were completed or nearly complete by June 45 BC and the *Tim.* was begun in that same period, then we have a nearly contemporaneous alignment of usage—either Cicero coined *effector* while writing the *De Fin.* and used it to render the feminine of δημιουργός or coined it early in the translation of the *Tim.* and then used it in the *De Fin.* as well.[177] It is

Et pone quos aut ante labantur, quisque temporibus a nostro aspectu oblitescant In this section we find the unusual inchoative verb *oblitesco*

175 See also discussion in PUELMA (1980), 173.

176 See RIBBECK (1871), 132; DE MELO (2019), 2.919.

177 On this feminine suffix and its relationship with the masculine *-tor*, cf. HOFMANN-SZANTYR, 1.376–377.

render κατακαλύπτω. The verb is found first here, but it is (nearly) contemporaneously used in Varro (R. 1.51.1) and more likely a rare Latin verb rather than any particular morphological calque. Note that the form *l ă t* is also found in Cicero's *A r a* translation (385), with the unique sense of 'concealing' (as opposed to *l ā t* 'to grow broad'; see *T L L* 7.2.1003.6 f.).

38 (*Ti.* 40d): reliquorum autem, quos Graeci δαίμονας appellant, nostri opinor lares, si modo hoc recte conversum videri potest We see in section 38 another example of the rhetorical technique of *c a p t a t i o b* where Cicero posits a Latin translation of a Greek term but only hesitantly ('of those remaining *d a i m*, as they are called by the Greeks, or *L a r* as I think it is to us, if perhaps this might be seen as the correct translation'). HUTCHINSON puts this hesitation down to a 'self-consciousness' in Cicero's awareness of the cultural differences between Greeks and Romans.[178] One could also view it as a rhetorical trope, used deliberately to suggest Latin equivalents for Greek terms, although here neither a technical one nor a Latin coinage but rather a careful equivalence made by the speaker in matching the Latin lesser gods with their Greek counterparts. Note that the word *l a* also possesses its own limitations and is not strictly the appropriate translation of δαίμονες, which is a broader concept.[179] Apuleius later renders δαίμονες with the circumlocution (along with other terms):[180] *P l a t o n i c r e d a m i n t e r d e o s a t l o c o m e d i a s q u a s d a m d i* (*A p . m.* 13.2) 'I believe Plato's doctrine that certain heavenly powers are situated by their nature and position halfway between gods and humans' and Calcidius uses the loan-word *d a e m o n* in Latin and defines it as *a n i m a l r a t i o n a b i l e i m m o r t a l i g e n t i a m h o* 'a rational, immortal, passible, ethereal living being engaged in the care of human beings' (*C o m m.* 135; see *T L L.*, *s . v .* 5.1.4.42; 5.1.4.84; 5.1.5.27).[181] In sum, the Lares themselves were the 'good spirits' of deceased individuals, who brought prosperity and other benefactions after death. Each Roman house had a *l a r f a m.*[182] SAMTER (1901, 25) considered the Lares to be equivalent to 'ghosts' associated with cults of the dead, citing examples of burning food that had

178 HUTCHINSON (2013), 199; cf. also REGEN (1971), 15: '[Cicero] ist aber selbst mit ihr am unzufriedensten.'

179 DEN BOEFT (1977), 11. See also discussion in SEELE (1995), 31–32.

180 See REGEN (1971), 15 n. 54.

181 Manuscripts **A** and **B** have *d a e m o* and **V** has *d e m o* but I retain PLASBERG's Greek spelling here for clarity. The *T L L* also records no Latinized orthography of the term prior to Apuleius, see s.v. *d a e m o n*, 5.1.41.52–53: '*l e g i t i V a r r o* Men. 539 *κακὸς δαίμων*, *l a t i n e i n d* (= Apuleius)'.

182 See NETTLESHIP et al. (1894), 343–344.

fallen onto the floor before the Lares. In any case, the role of the Lares certainly expanded into many aspects of Roman life, especially after the Late Republican period under Augustus, including guardians of roads, crossways and wayfarers and even of the state in general (see *O C D* .). These differed from the Greek conception of *d a i m*, mainly seen as unexpected spirits intruding into the lives of humans. From Homer on, *d a i m* could be used as an appellation for the Olympian gods themselves. *D a i m* thus acquired connotations of 'Fate'. It is possible that Cicero was thinking of the meaning of *d a i m* introduced by Hesiod (*O p* 122, 126), in the sense of 'guardians' and wealth-bringing spirits, which later came to denote 'personal protecting spirits', who accompanied human beings, bringing them luck or charms, hence the adjectives εὐδαίμων and κακοδαίμων attested as far back as the fifth century (see *O C D s . v* .). *d a i m o*

2.1.9 Translation of the Gods

39 (*Ti.* 40e): ut Oceanum Salaciamque Caeli satu Terraeque [...] ex is Saturnum et Opem, deinceps Iovem atque Iunonem Cicero's Romanization of the pantheon of gods or, more accurately, the lineage of deities of special significance to Romans: Caelus and Terra, Oceanus and Salacia, Saturn, Ops, Jove, and Juno. These do not exactly match Timaeus' lineage in Plato: Uranus and Gaia, Oceanus and Tethys, Phorkys, Cronos, and Rhea. Tethys and Phorcys have no equivalent in Roman mythology (see e.g. Verg. *A e*. 5.239–240: *e u m q u e i m i s | s u b f l u c t i b u s N e p t u n i d i u m P h o r c i q u e* and *o r u s P* 5.823–824: *e t s e n i o r G l a u c i c h o r | T r u i s t o n e u s q u e c P h o c i q u e e x e*); but Cicero likely saw Salacia as equivalent to Tethys (hence Servius' commentary on Vergil, *G e o* 1.31: *h a n c T e t h y n C i c e r o e o S a l a c i a m*). Ops corresponds to Rhea and Saturn to Cronos but Jove and June are Cicero's additions (Jove corresponds to Zeus, whom Plato omits in his lineage, and Juno corresponding to Hera, also omitted by Plato). Cicero here clearly adapts the mythical genealogy into a Roman context, echoing the *p r o h o e* to this work where Cicero re-contextualizes Plato's *T i m a e* dia- *u s* logue into a Roman province (Cilicia) and into the mouths of Roman speakers.

2.1.10 'Fate' in Cicero's Translation

40 (*Ti.* 41b): neque vos ulla mortis fata perement In *T i m a e* 41a, Cicero translates the Greek notion of μοῖρα (but here specifically a Platonic cosmological context)[183] with *f a*, plural of *f a t*.[184] The Greek is a genitive singular: οὐδὲ

183 Contrast e.g. early expressions of μοῖρα in Homer (*I* . 16. 488–489), see e.g LEUMANN (1950/1993), 280. See further discussion in WASZINK (1970), i.

184 Cf. also Cicero's other lexical innovation of *c o n f* (*F a t* . 30), where he does not give the

τεύξεσθε θανάτου μοίρας 'nor will you partake in the destiny of doom' (as τυγχάνω usually governs the genitive),[185] and Cicero might have read μοίρας as an accusative plural, interpreting τυγχάνω as 'come upon, meet with' + accusative: 'nor will you come upon the destinies of doom'. An alternative is that he wished to use poetic language in his translation, invoking the 'Fates' of death as a striking image for this section, given that the Creator is addressing the lesser gods directly, the language is, expectedly, loftier, almost Milton-esque. To add evidence to this, the plural form *fata* was sometimes used in his orations for exaggerated effect apropos 'destiny' or 'death' (e.g. *Cat.* 3.20 or *Ph.* 10.20). Similarly, in his philosophical works such as *De Am.* 35, when Laelius quotes from Scipio: *haec cita multa quasi* 'So many dangers of this kind hang *like* over friendships.' The plural form also appeared twice in Cicero's own translation of Greek poetical works in his versions of Homer's *Il.* 2.300 and 302 in *De Div.* 1.63 and 2.30: ὅτε τὸν Κάλχας μαντεύεται ἦε καὶ οὐκί = ***auguris*** *ut nostri fata quae dicant sint necne* 'that we may know the fates of our prophet Calchas, or whether they are empty fancies of his heart' and 2.302: οὓς μὴ κῆρες ἔβαν θανάτοιο φέρουσαι = *quin* ***funestis*** *liquerunt fatis* 'those who have not departed from the lights by the deathly fates'. The adjectival form *fatalis* is later found in *Tim.* 43: *iuxta quasi in curru universitatis imposuit sarias deis*. Cicero had used this adjective with *necessitas* in *De Nat. Deor.* 1.55, to translate εἱμαρμένη: *hinc* (sc. the Stoics) *extitit primum fatalis necessitas* εἱμαρμένην *dicit*. Similarly, *fatum* in the singular is later associated with the concept of εἱμαρμένην in *De Div.* 1.125, where Cicero, through the character of his brother Quintus, translates the Greek term using a translation method known as 'componential analysis' (cf. NEWMARK [1988, 114 ff.]). This is the comparison of the original term with a word in the target language, which has a similar meaning but no obvious one-to-one equivalent, by demonstrating first their common and then their differing sense components. Such a practice encompasses loan-shifts or other forms of semantic augmentation. NEWMARK makes the salient point (1988, 117): 'The only purpose of [componential analysis] in translation is to achieve the greatest possible accuracy, inevitably at the expense of economy. However, it is a technique that is more precise and limiting than paraphrase or definition. In practice, you are pick-

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Greek equivalent, however it has been suggested that συνειμαρμένον was the original term, but the suggested Greek equivalent does not occur in the Stoa (LSJ: s.v. συνείμαρται: '*has been determined*, Aristid. *Or.* 24 (44) 56; συνειμαρμένα *joint ly det, ermine*' Plut. 2.569 f., cf. Lyd. *Men.* 4.81'); see also MEIJER (2007), 225 n. 1154.

185 See e.g. GOODWIN (1892/1997), 233–234.

ing out characteristics in their order of importance.' So: *fi [...] roi mni a fato rati o cogi [...] fi ad tae pr, qpi u. o Fl ad Ge ipuarpévnv, id est ordini serie mq u, ec u mnuc sa au rs ua m c a u s a n e* 'Reason forces us to admit that all things are fated. Now what I call Fate is the same as the Greeks call εἱμαρμένη, that is, an orderly succession of causes wherein cause is linked to cause and each cause of itself produces an effect.' This is the perfect participle of μείρομαι 'receive as one's portion'. PEASE (1921, 483) notes: 'The term εἱμαρμένη (sc. Μοῖρα) is from the verb μείρομαι (root σμερ-) and properly denotes one's "allotment" [...] but it seems in Stoic etymologies to have been referred to as εἱρμός (εἴρω), with which cf. the Lat. *S e r (si ee, cf. F a t: c a u s a c a u s a m)*.' Certainly, μείρομαι and *f a t* are not cognates[186] and Cicero's translation of the latter for the former—first in the *T i m* and then in the *D e N a t u r a* and *D e r D i m v i*—can be seen as deliberately Stoicizing in the sense PEASE described. In the sense Plato uses it, the phrase θανάτου μοίρας, much like other nominal derivatives (μόριος, μορόεις), associates these 'fates' with death, and Cicero conveys this by including *m o r*, which closely echoes the original Greek sense. He places the *f a t* as the subjects of an added verb *p e r* (alternative spelling of *p e r* 'to reduce to nothing, destroy, annihilate' *O L D s . v*, 1) so that the sentence poetically reads: *n e q u e v o s u l l a m f a t a p e* 'nor will the destinies of death destroy you.'

42 (*Ti.* 14): ad temperationem superiorem revertit In the next section we find a second usage (see discussion above) of *t e m p e*, used to translate *T i* 41d: καὶ πάλιν ἐπὶ τὸν πρότερον κρατῆρα. Plato uses the metaphor of a κρατήρ, the concrete image of a 'mixing vessel' (cf. *P h a* 11d: ἦ πολὺ μὲν ὕδωρ ῥεῖν ἐξ ἀλλήλων εἰς ἀλλήλους ὥσπερ εἰς κρατῆρας), whereas Cicero retains the verbal abstract to convey the sense of a well-combined mixture.

43 (*Ti.* 41e): leges fatales ac necessarias et ostendit This phrase can be contrasted with *D e N a t u r a* 1.55, where, towards the end of the Epicurean Velleius' attack on the Stoic conception of 'that inevitability of Fate', Cicero has the gloss: *i l l a f a t a, q u i a s* εἱμαρμένην *d i s* sc. *l e* the *f a t a* agrees *s* in number with *l e g* and so the term is pluralized to give the sense of 'destined and inevitable laws'.

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186 Note that the use of *f a t i s* a noun first found in Cicero, with earlier Roman philosophers such as Lucretius using the term elsewhere (2.257) but Cicero's use of it as an equivalent to εἱμαρμένην in the Stoic/Academic sense is unique. For the etymology, see BEEKES (2010, 922): 'Corresponding forms outside Greek are doubtful. Lat. *m e r* [*e.*] 'to earn, acquire" (if properly *"to get one's share") might be cognate, but its formation, *(*s*)*m e r* -, is different.' See also MALTBY (1991), 380 citing Donatus' (Ter. *A n d* 33.1) definition of *m e r, e o* describing the 'earning of a salary in exchange for labour': *m e r e r e e s t a l i q u i d m e l a b o r e. s u m e r e*

2.1.11 Cuneoli and the End of Cicero's Timaeus

47 (*Ti.* 43a): propter parvitatem crebris quasi cuneolis inliquefactis The term γόμφοι 'bolts' or 'rivets' in Plato's original is rendered by a diminutive of *cuneus* 'wedge' so that the 'small pegs' which the gods used in creating the human body, imitating the Creator, are συντήκοντες or 'fused into one mass, welded together' (LSJ s.v. συντήκω) or *inliquefactis* 'made of liquid, melted' (*OLD* s.v. *in*) into *unum corpus*. Two words are first attested in this section and the familiar use of *quasi* as a possible clue that these are Ciceronian lexical innovations. However, although the diminutive *cuneolus* form appears to have been used first here, it is found in Vitruvius (10.12.1 *cuneoli*), then Columella (4.29.10 *harundinei cunei*) and Palladius (*Opus agr.* 3.17.3). That the diminutive seems to have been attested in architectural and agricultural writers too suggests its status as a technical term in both subjects and probably militates against any Ciceronian novelty here. *Inliquefactis* is a far more likely candidate as a lexical innovation, only attested in this work and Cicero's near-contemporaneous *Tusculanae Disputationes* Book 4. The contexts in both works are different, but the manner in which Cicero introduces the word in each is almost identical, with the typical marker *quo modo quasi* used to introduce the novel term to his audience (*Tusc.* 4.20): *ad perfundendum animum tamquam voluptate* and *Tim.* 47e): *quasi cuneoli* (corresponding to 43a: ἐμφερῆ πυκνοῖς γόμφοις συντήκοντες).[187] The question of when the term was first used provides us an opportunity to use lexical innovation as a discrete linguistic phenomenon, into textual territory in dating, or at least speculating, as to the chronology of a given author's corpus. Was it more likely that Cicero neologized a new term *exinliquefacere* in the *Tusculanae*, to convey the concept of *voluptas* 'liquified pleasure' (*inliquefacere*)[188] or was he accomplished, so to speak, to coin the term in rendering Plato's συντήκοντες (from συντήκω) in his translation of the *Timaeus*? I am inclined towards the latter given that there was a direct need for an equivalent and that this was done by a close, literal translation (a morphological calque):

– συν- often has the meaning of the completion of an action, altogether, completely, strengthening the force of the simple word (see LSJ s.v. συν DI2) and *in-* can indicate a form or into which something changes, grows, is made, etc., 'so as to become, to, into' (see *OLD* s.v. *in-*, 19a).

187 Plasberg (1908), 192 notes the following *variae lectiones*: *cuneate* (in codex V), *inliquefacta* with *u* superscribed above the word (A), also *inliquefacta* (V) and *inliquefacta* (B).

188 Perhaps echoing Lucretius (4.1106): *membra voluptate dum vi labefacta*

– τήκω 'melt, melt down' (LSJ, s.v.) = *liquitō* 'become fluid, melt, liquify' (*OLD*, s.v.)

We might venture to say, following MARINONE AND MALASPINA (2004/2009, 215) that the *Timaeus* translation was completed before the *Tusculanae Disputationes* (or Book 4 at any rate). Whichever reasoning one accepts, this particular lexical innovation is good evidence that both works were composed in close proximity to each other.

48 (43b; lacuna): * urere [...] lucere [...] per oculos emicare defenstrix In *Timaeus* 48 we come across the term *defenestrix*. There are two separate *testimonium* for this section, firstly Augustine: 'If the lesser gods, who were charged by Plato with the making of man and of the other terrestrial animals, were able, as he says, to remove the burning quality from fire while leaving that [quality] of shining to spring forth through the eyes.'[189] The words for 'burning', 'shining', and the 'springing through the eyes' are all present in Cicero's translation, though it is here that another lacuna interrupts the text and the fuller account Augustine presumably had access to in his day. The second *testimonium* is from Priscian (KEIL [1857–1870/2009], 3.19) where he discusses the formation of feminine agent nouns in *-r* and notes that Terence added a *-t-* before the suffix to allow for euphony, giving the example of *tonsa*, and that *natrix* Cicero did likewise–Priscian cites his use of *defenestrix* (*vel sic ut ferunt in hac strix quo quidem in Timaeo operis*). *TLL* 5.1, s.v. defines the word as '*f. te. [...] ii est non sororem quidem* and *OLD* as '*f. One who*'.[190] It seems to render Plato's abstract noun σωτηρία (*Ti.* 45d) 'deliverance, preservation'. In Cicero's translation, agent nouns in the *-t-* suffix were a lexical trademark, as we saw above with *altator* and *effector*, and it would not be out of keeping for Cicero to have used *defenestrix* in the lost section of the translation, now lost to posterity.[191]

49 (*Ti.* 46c): id fit cum speculorum levitas In translating *Ti.* 46c τοῦτο δέ ὅταν ἡ τῶν κατόπτρων λειότης ἔνθεν καὶ ἔνθεν ὕψη λαβοῦσα, Cicero uses *levitas* (from *levis*) to take λειότης 'smoothness' neatly. It would be natural to assume this was the first time this term had been used with this novel sense by Cicero,

189 Aug. *Civ.* 13.18: *si dii, quos in hoc opus sibi inferiores animalia terrestria fabricare dum committi, posse ut ignis urendi quod habet natura non amittat, lucendi autem per oculos emicare.*

190 The hapax here suggests that Cicero's unique use of the term is not impossible to believe, cf. Cicero's other hapax *pertutor* (*OLD* s.v. 'one who throws into confusion') in *Leg.* 1.39 where the masculine form *pertutus* was not attested until the fifth century AD in Sulp. Sev. *Chr.* 2.49.2 or *altator* above; see KEIL (1857–1870/2009), 4.12–13 for a discussion on manuscript differences in *defetor* or the later-attested *defensatrix*.

191 See MÜLLER (1964), 129 who counts 28 *-tr-* formations in Cicero's *philosophica*

arising out of the morphological calque. However, the term appears earlier in Cato's *De agri* with this sense and in Cicero's earlier *De Or.* (3.199): *re ipsa tactu esse modum*. There are, in fact, two separate (nearly homophonous) lexemes with their own distinct etymologies in Latin taking the form LEVIS and LĒVIS and the concomitant abstract derivatives in *-tās*. The first is hypothesized to be a reflex of P.I.E. root *h₁lengʷʰ-* 'light' and the latter from *leiH-* 'smooth', whence Cicero's *lēvitās* in this section of the *Tim.* The term calques neatly onto λειότης because the Greek λεῖος and *lēvis* are cognates (both possibly descended from P.I.E. *leiH-*), presenting a rare instance of a semantic calque simultaneously acting as a morphological calque but not a Ciceronian coinage.

52 (47a–b): **quibus ex rebus philosophiam adepti sumus [...] mortalium generi deorum concessu atque munere neque dabitur** SEDLEY (2013, 201) argues this was the final line of Cicero's composition: 'This rousing climax was a natural place to stop.' The rhetorical trope of philosophy as the greatest gift to mortals from the gods that Cicero ends with here is not novel to this work. REID (1885, 97) and GLUCKER (1970, 231), among others, have noted this formula also appears in other works (e.g. *Am.* 47; *Fam.* 3.4.16, *Leg.* 1.58, *Off.* 2.5, *Sen.* 40, and *Tusc.* 1.64). Pliny the Elder uses a similar formula when discussing trees and forests in *Nat.* 12.1: *summumque munus homini data arbore bene legi*, 'the trees and forests were understood to be the supreme gift given by her to man'.[192] The formula of 'gods' or 'nature' having given mankind (*datum est*) the 'best' or 'supreme' gift (*munus*) of philosophy is loosely paraphrased in *De Leg.*, *De Div.*, *Academica*, and *De Fin.*, which were (possibly) all later works, although *De Leg.* is unfinished.[193] The formula was also used in the *Fourth Phil.* (4.7.18–19) in a different way when Cicero mentions the family of the Bruti: *videtur enim quasi deorum immortalium numen in hanc familiam Brutorum*. 'The family and name of the Bruti have been given to the Republic as though by the grace and bounty of the immortal gods.' We might suggest that the variations of this phrasing in Cicero's works might have been derived initially from Cicero's translation of Plato in this last line of his *Tim.* version.[194]

192 Cf. also Pliny the Younger, *Ep.* 6.16.3.

193 See discussion in ROBINSON (1943), 112. It could be dated between 46 and 43 BC; see *Fam.* 9.2.5 for the former.

194 See also discussion in BOYANCE (1954), 215.

3 Chapter Summary

This chapter has centred around a selective lexical commentary on Cicero's partial translation of Plato's *Timaeus*. We observed this work to be a useful microcosm of the broader theme of this book: the notion of a *philosophia translata*. On one level, Cicero transferred the dialogue into a different environment than Plato's and this was done by altering not only the characters and location of the dialogue[195] but the philosophical terminology too. Nonetheless, Cicero did not have his characters regurgitate Greek loan-words when describing the creation myth devised by Plato through the mouth of Timaeus (in Cicero's version, probably through the Neo-Pythagorean Nigidius Figulus). Instead, he translated the philosophical terms using the lexical resources of Latin (sometimes well-established words, other times rare or poetic forms to give the translation a heightened style). He often added new technical meanings to existing terms, which reduced the risk of his translation becoming too dense with technical and unfamiliar terms. Parts of the translation remained faithful to Plato's original Greek (hence the 'transference' aspect in the theme of *trans*). This *data* was seen, for instance, in the account of the creation of the Soul, where the language became much more dense and complex. In other sections, such as the change of Greek deities into Roman ones, Cicero was freer and more creative in his adaptation of Plato (hence, the broader 'translation' or 'novel application' dimension of *trans*), sometimes even turning aside to his Roman reader and glossing Greek terms directly with novel Latin words (e.g. in the case of *medioxumi raos p*). But where Cicero resorted to neologism, his rhetorical instincts were at play using the tried and true orator's techniques such as *variatio*, *adoptatio* and *praeparatio* to ease his listeners into accepting his newly coined terms. In this way, Cicero was conscious of his translation as an independent literary work guided by principles of style and intelligibility for his Latin readership, balanced against the need for fidelity to the Platonic source material. As we have seen, this sometimes led to a conflation of terms and a replacement of Greek concepts with new Latin ones; for example, the various renditions of Plato's difficult οὐσία—choices that would become important for later Latin philosophy. The translation also raised ancillary questions, such as the extent of Latin mathematical vocabulary and how much genuine lexical innovation was at play for Cicero in rendering Platonic geometric theory, or whether he, instead, drew upon existing technical terms simply not preserved

195 Ephesus, an unusual location, which might have been inspired by settings of Peripatetic dialogues such as those of Dicaearchus of Messina's, cf. his comments about writing works *more Dionysiano* in *Att.* 16.13a.3. See also comments in GÖRLER (1989), 250.

to us in Classical Latin texts. Thus, Cicero's *Timaeus* greatly highlights each of the key themes of this book: the trope of the *ages* of Latin philosophical vocabulary, the *transfer* of Greek knowledge through a Latin linguistic lens, and the specific lexical choices in translation that shaped the diachrony of central philosophical concepts into posterity. Though the prefaces to many of his late treatises would have us believe Latin was already superior to Greek philosophical vocabulary, we saw that Cicero needed to work hard to coin new terms or extend the semantic range of existing Latin ones, often asking existing terms to do more work than they could (e.g. *materia* for Plato's οὐσία). Though there were some difficulties in his lexical creations, we also observed an adept translator, aware of the complex ideas within his source material. In this respect, Cicero exhibited a specific translation praxis that drew on familiar rhetorical techniques and lexical inventiveness to capture the sense of a Greek term accurately (as seen, for example, in his translation of the Greek terms σωφροσύνη, πάθη, and μελαγχολία). The need for new terms meant linguistic experimentation and, as with many experiments, there are failures. Cicero was not always wedded to the neologisms he introduced in translating Greek terms, as we saw with *vertibilis* or *mundialiter*, largely for stylistic reasons, but the fact he chose to introduce them to his readers in the first instance provided a clue as to his overall praxis. More often, these unfamiliar coinages did not represent some random inventiveness but served a specific purpose, such as the *praetexta* employed by a skilled orator, allowing the reader to first understand a Greek term through a literal morphological calque, but subsequently abandoning it on account of stylistic (and sometimes conceptual) sensitivities. So with *vertibilis*, as discussed in Chapter 2, not only was the compound less acceptable formally for Cicero to use in his prose, but the very sense of the calque did not convey (at least what Cicero understood as) Aristotle's ἐτυμολογία effectively. Similarly, with his translations of Plato's ἀίδιος and αἰώνιος in the *Timaeus*, Cicero demonstrated a conceptual and terminological understanding of his source material, encapsulating the Platonic Creation myth and its two different conceptions of Time carefully, despite the lack of distinction in Plato's own terminology.

Our analysis of Cicero's version of the *Timaeus* will also serve as a useful comparator with later authors' translations of Platonic and Aristotelian texts. So we will see that Calcidius' and Boethius' translations of Plato's *Timaeus* and Aristotle's *Organon* respectively were more greatly affected by the influence of literal translation techniques (e.g. calques) than Cicero would permit in his translations. This highlights the contrast between the stylistic considerations that affected Latin authors composing philosophy during the first century BC, as opposed to the increased formal literalness of authors adapting Greek philosophy into Latin during the later eras of Calcidius and Boethius.

CHAPTER 4

Apuleius' Translations of Greek Philosophical Vocabulary: A Case Study of the *De Mundo*, *De Platone Et Eius Dogmate*, and the *Peri Hermeneias*

> *Nomina etiam Romanis inusitata; et in h*
> *ea tamen nomina labore meo e, tu s studio i*
> *tamen Latina monetа percussa sint*
>
> [T]here are words unusual to Romans and, as far as I know, up until now, non-existent; and though these terms come from the Greek language, nonetheless, through my studious labour, new Latin coins have been stamped.
>
> APULEIUS, *Pro Sed (Apol.)* 38.3

The extent to which L. Apuleius' (c. 125–c. 170 AD) translations of Greek philosophical texts reshaped Platonic and Aristotelian thought in Imperial era Latin forms the next stage of this study. In particular, this chapter examines the techniques Apuleius adopted to Latinize Middle Platonic concepts using literary and rhetorical techniques. The second informs the first to some extent in that, if Apuleius' practices of lexical innovation were extensive and if these practices re-interpreted the Greek sources into original literary creations, there will be evidence of a written tradition between the literary translations and adaptations of Lucretius and Cicero up to the second century AD. This practice, as has been so far discussed, involved Roman authors' interpretations of Greek philosophical terminology. As in Chapters 1 and 2, this requires a collation of lexical data sourced from the author's philosophical treatises and translations where the process of re-interpreting Greek philosophy can be directly observed.

Note should be made of Apuleius as the first author in this book's case studies not to be based in or around Italy itself, but rather an inhabitant of a Roman province in North Africa. Apuleius, though educated in Rome and Athens, did not remain there, but returned to Numidia and travelled extensively.[1] The tra-

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dition of Latin philosophy, specifically those who contributed to the development of its philosophical vocabulary, shifts geographically after Apuleius with the reception of pagan intellectual traditions into Christian philosophy. Indeed, those thinkers who greatly influenced Latin philosophical vocabulary in the first few centuries (c. first to fourth centuries AD), such as Tertullian, Lactantius, Augustine, and Marius Victorinus all came from the provinces. This alone is not a significant fact, but it suggests that the tradition of philosophical translation in Latin went beyond the intellectual circles of the Italian peninsula and began to manifest itself in the distant reaches of the empire, in different socio-linguistic and intellectual environments.[2] Despite this, the influence of the authority of Classical-era authors such as Lucretius and Cicero becomes clear in many of the approaches towards lexical innovation, especially in Apuleius, adopted by these authors writing outside of Rome.[3]

1 Apuleius' Approach to the Creation of Philosophical Vocabulary

In the *Apol.* (38.5), Apuleius provides us an insight into his practice of lexical innovation:

> *in quibus animadvertes [...] nomina eti*
> *ernumquod sciamin fecta; eatamen no*
> *Graecis provenire, ut tamen Latina mo*
>
> In [my works] you will notice [...] that there are words unusual to Romans and—as far as I know—up til now, non-existent, and though these terms come from the Greek language, nonetheless, through my labour and zeal, new Latin coins have been stamped.[4]

The *ge* strope of Lucretius, Cicero, Quintilian, and Seneca can also be observed in *De Platone*, where with the *Explicit* by Cicero an invoc-

1 For evidence of Apuleius' education in Carthage, Athens, Rome, and wider travels to Asia Minor, see KOOTEN (2003), 50 (esp. n. 125). Note also *Fl.* 20.4.

2 As MORESCHINI (2005), 485 observed, the societal makeup of North African provinces, particularly Carthage, was more civilized than many of the others of the Roman Empire, renowned for its prosperity. Its flourishing Christian intellectual culture towards the end of the second century included the study of not only the Latin language, but of Greek too.

3 See e.g. Apuleius' praise for Cicero in *Ap.* 95.5. Also HARRISON (2000), 83; KEULEN (2014), 139–142.

4 *Ap.* 38.5.

ation of a *c a p t a t i o b* 'For mind indulgence may be given to the novelty of my words in serving the obscurity of these matters.'[5] We see here a continuous tradition of a specific kind, one which recognizes the need for new terms in Latin philosophical vocabulary, but whose cause is the apparent 'obscurity' of the original Greek terms which require discussion in Latin. There is a further question as to what Apuleius actually intended by the *m o n e t a p e r c u s s i o* metaphor. There are two possibilities: either it is an expression for the creation of new terms *e x n i h i l o* or the impressing of new forms on existing material (either Greek originals marked with a 'Latin stamp' or existing words in the language being repurposed for philosophical ends)—as in the process of how coins were minted.[6] The latter seems more likely in my view. A brief survey of similar usages in earlier authors is illustrative. In Quintilian (*I n s t. O r.* 8.6.3), the metaphor appears as a didactic tool for orators in the usage (*c o n s u e t u d o*) of language: *u t e n d u m q u e p l a n e , c u m s u e i r p u b l i c a e n u m m i s i n t e r q u o s u s u s e s t , t a m q u a m p u b l i c a f o r m a e s t* 'we ought to use language as currency, upon which is the public stamp.' Here, Quintilian is treating the *s e r m o* as a common good, to be used in a way that is established and customary (*c o n s u e t u d o*). Quintilian's sentiment would also be repeated by Fortunatus (*A r s R h e t.* 2.9–10). By contrast, in Horace (*A P* 48–51): *s i f o r t e n e c e s s e e s t i n d i c i i s m o n s t r a r e n o v i s r e b u s n o m i n a c i n c t u t i s n o n e x a u d i t a , d a b i t u r l i c e n t i a d o c t i s c u m g r a e c i s f a m i l i a r i b u s* 'If perhaps one must be taken aback in treating things by novel terms, you will have a chance to fashion words never heard of by the kilted Cethegi' and at lines 58–59 of the same work: *l i c u i t s e m p e r f u i s s e l i c e b i t q u a e n u n c a s i g n a t u m p r a e s e n t i s t u l i t n o t a e* 'It has been, and always will be, permitted to produce a word marked with a present-day seal' (trans. FAIRCLOUGH [1926], adapted).[7] Also in Juvenal (7.53–55): *s e d v a t e m , c e u g i r e g i n o n s i t p u t a n d u m q u i b u l i n c i a h v i e l n e a x p o s , i n t e r u m q u e s u o l o c o c o n t e n t u m d u x e r i t a d y t a c a r m e n t r i* 'but the lyre excellent to hard, with whom there is no common genius, who usually spins out nothing vulgar, who does not stamp a trivial song on public money' (trans. BRAUND [2004]). The most revealing is in a letter by Fronto to Antoninus Augustus (136.9 f.): *i n p r i m i s o r a t o r i c u m q u o d n o v u m v e r b u m u t a e u s t a u d h u u l m t e e t r ü d a t (u e m m p) e v e t u s t a t e n o s c a* 'First of all, a speaker must be aware that the *e l e c t e*

5 *D e P l a t o n e e t* (*P l a t.* 2.20: [...] *d o e g t m u a r t æ n i m v e n i , a e n o u m i n t o d o s i c u r e r i t a t i b u s s e r v i e n t i*

6 For the process of minting coins in Roman times, see ADKINS AND ADKINS (2014), 344: 'Later coins were made as blanks that were originally cast in open molds, although they may have been cast on flat surfaces. The blanks or flans were then stamped with a pair of dies—the lower die for the obverse and upper die for the reverse [...] The upper die (trussel) was held over the blank and struck with a hammer.'

7 See discussion in BRINK (1971), 146.

does not coin a new word like debased bronze, so that one word and precisely one word may be both known by its old age and please by its novelty.' He later presses this point using an extended metaphor of words as coinage:

> ***monetam*** *illam veterem sectator. Plumbei r*
> *ini inistis recentibus nummis saepiu*
> *signatus est Perperna, arte factis pr*
> *nummum Antonini aut Commodi aut Pii po*
> *et maculosa maculosiora que quamnutr*
> *sonora, si possit, ut hebetatiorem li*
> *aliquo dnon factum ap⟨e⟩rtes(namid qui de mabsurd*
> *usurpatumconcinnius aut congruenti*
>
> Be a follower of that old money. Lead coins and adulterated metal of every kind are more often found in new money than in old, on which is stamped the names of Perperna, manufactured by a pristine art. What then? Would I not prefer a coin of Antoninus or Commodus or Pius? Stained and contaminated and worthless and spotted, more spotted than a nurse's apron! May each pipe of your flute resound loudly, if possible, so that you may render your language more mellifluously rather than more dully; you may look for any word not coined outright (for that indeed is silly) but used more elegantly or more aptly or more agreeably.[8]

Fronto's exhortations to look back upon the pristine coins (sc. vocabulary) of the past are a warning against lexical innovation in general, arguing that the creation of entirely new words is *absurdum*. Perhaps he means what modern linguists refer to as 'nonce formations', or he might have been thinking also of derivations in this category, it is unclear in the text. The linkage between the metaphorical use of 'minting' words as coins in Apuleius and other authors can be traced from a specific tradition of rhetoric, possibly beginning with Quintilian, warning against rhetoricians and writers resorting to outright neologism. However, Apuleius, like Horace to some extent, is prouder of minting new words when adapting Greek concepts into Latin, seeing it perhaps as his own intellectual achievement *vis* – the Greek originals rather than a vice of Latin style.[9]

8 Front. 136.9 f. The text is quite corrupt in places due to the way in which the text has been preserved to us (via palimpsest); I follow the Teubner text in the edition of VAN DEN HOUT (1988), 159 with further textual suggestions included from VAN DEN HOUT (1999), 377–378.

9 See also the discussion in HIJMANS (1994), 1745–1746.

2 The *De Mundo*: a Case Study of Apuleian Translation and Lexical Innovation

In contrast to the freer and more creative composition in his other philosophical works such as the *De Deo S*, where few technical terms are subjected to translation in Latin, we can begin with Apuleius' translation of the pseudo-Aristotelian[10] Περὶ Κόσμου. It is an important text in its own right, where one observes his translation techniques and his various approaches to lexical innovation. The Greek original was subject to multiple translations in antiquity and complete versions of it also existed in Syriac, Arabic, and two Armenian translations.[11] The issue of authenticity has dogged much of the discussion about the nature of the *De Mundo* in Apuleius' corpus. PURSER argued that it was an Apuleian work of his later period due to the general 'lack of grasp' of the Greek original, which suggested it could not have been done in the same period of, or shortly after, his education in Athens earlier in life.[12] HARRISON concludes that the work is 'typically Apuleian'.[13] I proceed on the basis that the translation is an authentic one. This assumption stems from the weight of textual criticism regarding the authenticity issue[14] so far and the common attribution of authorship to Apuleius as early as the fifth century (for instance by Augustine, who had significant knowledge of Apuleius and his works and Servius).[15] The translation itself covers the sections of the Περὶ Κόσμου from 391a1 to 401b29 and is neither literal nor simply a reproduction either.[16] Scholars have variously referred to it as 'free translation' or 'adaptation'[17] of the original Greek. Importantly, these cursory summaries of Apuleius' project here (or more precisely,

10 That Apuleius himself regarded the Greek original to be non-Aristotelian has been argued by scholars, see HIJMANS (1987), 429 and THOM (2014), 4.

11 LORIMER (1933); GOTTSCHALK (1987), 1132.

12 PURSER (1911), 250–251.

13 HARRISON (2000), 181; see also FOWLER (2016), 136 n. 6. See REGEN (1971), 24 n. 79 for a brief survey of scholars who doubt Apuleius' authorship of the work.

14 See also LORIMER (1924), 20. See also KOOTEN (2003), 50 n. 124; BEAUJEU (1973), ix–xxix.

15 See HARRISON (2000), 175 for an overview, although he notes that attribution by such authorities is not proof of any kind of authorship, so discounting an Apuleian *Peri Hermenei* despite Cassiodorus' attribution. See also REDFORS (1960), 114–115 for arguments for and against the attribution of both the *De Mundo* and *De Platone* to Apuleius (in any case, he sees both works as 'undoubtedly' composed by the same author). Cf. also MARCHETTA (1991).

16 See MÜLLER (1939), 5; HIJMANS (1987), 428: 'Apuleius appears to make a strenuous effort to claim the work as his own'; REGEN (1971), 24; BEAUJEU (1973), 113; CONTE (1987/1994), 555.

17 See e.g. MÜLLER (1939), 130 f.; BEAUJEU (1973), 309; HARRISON (2000), 174.

the results of it) indicate something more complex: a linguistic renovation of a Greek philosophical work. For our purposes, this translation is therefore an important parallel to the translations of Greek philosophy undertaken by Lucretius and Cicero, who each had less of an interest in mechanically reproducing their Greek sources.

The opening of the *De Mundo* begins with an allusion to the familiar prefaces of Cicero's philosophical works (*pr.* 2.85),[18] 'In the course of reflection and most attentive examination, and on many other occasions, Faustinus, my son, Philosophia seemed to me the Investigatrix of Virtue and the Terminatrix of Vices, who shares in divine things' (*consideranti mihi et diu et saepe, Faustule, virtutis investigatrix et fugandis vitiis indagatrix divinarum rerum particeps*).[19] There are also echoes of Lucretius in *pr.* 2.87, with the image of Philosophy entering the heavens (1.73).[20] The combination of these allusions firmly locates Apuleius' translation as a creative, literary work of Latin literature in the tradition of his Classical Latin forefathers, rather than a mere didactic exercise for the benefit of uninitiated Latin readers. The personal interventions on the part of the author and the numerous glosses of Greek terms are both, according to HARRISON, 'characteristic features' of Apuleian translation.[21]

This chapter will examine potential lexical innovations found in Apuleius' translation, highlighting the translation techniques he favours and comparing these to the earlier authors in the case studies. I have compiled these terms in **Appendix 3**. The Latin text to which I make reference is based on the edition of BEAUJEU's edition (1973), with some emendations. I initially relied on the complete translation of the Latin text, which I undertook during my doctoral research in 2019, but have updated some of my own interpretations of individual passages based on the recent online translation by BOYS-STONES (2021). I have consulted LORIMER's translation (1933) for the Greek. In pinpointing purported Apuleian lexical innovations within the work, I have used a combination of manual examination supplemented by older works whose focus was on the literary and translation style of Apuleius but whose word-lists and indices are invaluable to a study of this kind: KOZIOL (1872), BERNHARD (1927),[22] MÜLLER (1939), REDFORS (1960, 51), and BALDASSARI (1986).

18 Numbering follows BEAUJEU's edition.

19 Compare Cicero's *de Or.* 1.1: *cogitanti mihi saepenumero et multum et Quinte et fratri Meae re ipsa et scriptis tuis* and *Orat.* 1.1: *mecum saepe et multum cogitanti*

20 See HARRISON (2000), 185.

21 HARRISON (2000), 188.

22 KOZIOL (1872), 249–309 and BERNHARD (1927), 337. Note that the latter's list is largely

3 Lexical Commentary: Particular Linguistic Features of the *De Mundo*

3.1 *Preface and Discussion of the Heavens* (285–295)

285 (*Mun.* 391a): consideranti mihi et diligentius intuenti, et saepe alias, Faustine fili? The preface of the translation is mostly faithful to the original Greek, with some minor variations. The addressee now becomes Apuleius' son, Faustinus, rather than Ἀλέξανδρος,[23] echoing the paradigm we observed in, for example, Cicero's *De Officiis* addressed to his son Marcus. FLETCHER argues Apuleius' address to his son here and in the second book of *De Platone* are read as an explicit protreptic: '[I]t states, proves and convinces someone to adopt the philosophy.'[24]

Virtutis indagatrix expultrixque vitiorum Almost immediately after the opening, Apuleius invokes the precedent of lexical innovation in Latin set by Cicero's homoeoteleuton in *indagatrix expultrixque* (*Tusc.* 5.5.13) to refer *quae vi* to Lady Philosophia.[25] Apuleius also uses a similar repetition in *De Platone et eius Dogmate* (176.14) discussing the virtue of *prudentia* and *scientia* as the *et ea spectatrix divinarum humanarumque rerum* (the latter noun not appearing in Apuleius). There are no equivalents such as *indagatrix rerum* in the Greek and the prosopopoeia of Philosophia as a divine goddess, who allows mortals to penetrate the obscurity of the Universe and to understand natural phenomena, is unique to Apuleius. The uses of *-trix* substantives with genitives (here *virtutis*) and *vitiorum*), anaphora, and as epithets are common literary devices found among Latin (especially Late Latin) authors.[26] Metatextually, the dual personification of Philosophy using the two unusual terms *indagatrix* and *expultrix* endows the work with a feeling of novelty. Apuleius' translation starts to take

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incomplete and occasionally erroneous, e.g. listing *grave* (from Vergil) as a 'Neubildung'. Similarly, KOZIOL's is extensive but also prone to minor errors, e.g. classifying *inrelaxo* as a neologism (1872, 270), despite it being well attested in both Livy, Pliny the Younger, and Tacitus. Similarly, *globosus* (1872, 289) is earlier attested in Accius, Lucretius, and Cicero.

23 Presumably the pseudo-Aristotelian author saw this as 'Alexander the Great', the famous pupil of the philosopher (referring to him as the ἡγεμόνων ἀρίστῳ 'best of princes' at 391b6–7), see FORSTER AND FURLEY (1955), 338; BEAUJEU (1973), 310.

24 FLETCHER (2014), 96.

25 The use of *-trix* nouns in homoeoteleuton seems to be a poetic trope, see e.g. Pl. *Mo.* 257; Ter. *He.* 48; Stat. *Si.* 3.5.108.

26 See e.g. Cic. *Cl.* 14; and as epithets in Cic. *To.* 95. Further SERBAT (1995); MAGNI (2016), 105. Cf. also LEUMANN-HOFMANN-SZANTYR, 2.157–158: 'Im Spätlatein nehmen diese adjektivierten *-trix*-Bildungen namentlich in der volkstümlichen und Übersetzungsliteratur überhand'. Cf. also 1.376–377.

on its own novel character, foreshadowed by the use of new and unusual Latin terms. In this way, Apuleius is doing two things: (1) deploying a type of inverse *captatio*, throwing the reader headlong into a strange linguistic experience, though based upon a familiar subject matter: the natural phenomena of the Universe; and (2) when he invokes the lines of Cicero's from the *Tusculanae*, Apuleius is placing himself directly within the same tradition as these philosophical pioneers in Latin.

289 (*Mun.* 391a): **singulas partes dignas laudibus credidissent, quibus esset universitas conprehensa** Now turning to the features of the cosmos in the *De Mundo* narrative, we find the term *universitas* (for κόσμος) which we may recall was used in Cicero's *Tim.* (and then in Pliny *NH* 2.11) to mean: 'The sum of things, the universe' (*OLDs. v.*, 1c). That Apuleius was familiar with Plato's *Tim.* is evidenced in the *Apol.* 49 (see e.g. REDFORS [1960], 19), however, whether he had access to Cicero's translation of it is uncertain.[27]

290 (*Mun.* 391b): **cuius cardinem—sic enim dixerim κέντρον** The first gloss we find in the work renders a Greek word that does not appear in the source text. The line translated seems to be 391b13: ταύτης δὲ τὸ μὲν μέσον, ἀκίνητόν τε καὶ ἑδραῖον ὄν 'The life-giving earth is in the centre, unmoved and foundational', which Apuleius translates as *cuius cardinem—κέντρον enim dixerim—terra est in medio, immobile et solidum pondus* [*sc.* the Universe's] solid and immobile pivot (for that is how I would render κέντρον) is occupied by the earth'. It is unclear why κέντρον, and not μέσον, is singled out. HARRISON suggests this is could be a correction of some kind.[28] However, Apuleius might have been referencing Aristotle's work *De Caelo* (293b30–32): ἔνιοι δὲ καὶ κειμένην ἐπὶ τοῦ κέντρου φασὶν αὐτὴν ἰλλεσθαι καὶ κινεῖσθαι περὶ τὸν διὰ παντὸς τεταμένον πόλον, ὥσπερ ἐν τῷ Τιμαίῳ γέγραπται 'Some again say that although the earth lies at the centre, it "winds", i.e. is in motion, "round the axis which stretches right through", as is written in the *Timaeus*'. Did Apuleius' Greek text of the *De Mundo* contain the term κέντρον instead of μέσον for the concept of 'spatial centre', or was it simply a confusion on Apuleius' part between *De Caelo* and *De Mundo*? In either case, Apuleius uses *cardo* 'the pivots or poles on which the Universe was supposed to rotate about the earth',[29] which Cicero had also used to translate Aratus' ἄξων (*N.D.* 2.105: *extremusque ad eam duplici cardine* [Aratus: *cardine* 22–24: ἀλλὰ μάλ' αὔτως ἄξων αἰὲν ἄρηρεν [...] καί μιν πειραίνουσι δύω πόλοι ἀμφοτέρωθεν]). The double translation *genetrix* (1.249) for μήτηρ and ἑστία *x*

27 Cf. also HIJMANS (1987), 417 n. 86.

28 HARRISON (2000), 188.

29 *OLDs.* v. 3. *cardo*

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التطبيقالسريري

تمددالأوعية الدموية

أن**تمدد الأوعية الدموية**[3]هي نقطة ضعف في الشريان أو جدار القلب. تشكل كيساً رقيقالجدران ومنتفخاً ينبض مع كل نبضة قلب، وقد يتمزق في النهاية.*تمدد الأوعية الدموية المتسلخ*،يتراكم الدم بين طبقتي الشريان ويفصل بينهما، وعادةً ما يكون ذلك بسببتدهور الطبقة الوسطى. أكثر مواقع تمدد الأوعية الدموية شيوعاً هي الشريان الأورطيالبطني.(**الشكل 20.3**)،الشرايين الكلوية، والدائرة الشريانية في قاعدة الدماغ. حتىبدون نزيف، يمكن أن تسبب تمددات الأوعية الدموية ألماً أو الوفاة نتيجة الضغط علىأنسجة المخ، أو الأعصاب، أو الأوردة المجاورة، أو المسالك الهوائية الرئوية، أو المريء.تشمل العواقب الأخرى اضطرابات عصبية، وصعوبة في التنفس أو البلع، وسعالأمزمناً، واحتقان الأنسجة بالدم. تنتج تمددات الأوعية الدموية أحياناً عن ضعف خلقيفي الأوعية الدموية، وأحياناً أخرى عن إصابات أو عدوى بكتيرية مثل الزهري. ومع ذلك،فإن السبب الأكثر شيوعاً هو اجتماع تصلب الشرايين وارتفاع ضغط الدم.

البطن
الأبهر

تمددالأوعية الدموية

شائع
الشرايينالحرقفية

الشكل20.3تمدد الأوعية الدموية.صورة رنين مغناطيسي للأوعية الدموية (MRA) لمنطقة البطن والحوض لمريض يعاني من ارتفاع ضغط الدم، تظهر انتفاخاتبارزة (تمدد الأوعية الدموية) في الشريان الأورطي السفلي والشريان الحرقفيالأصلي الأيسر.

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الشرايينالكلوية والطحالية. تحتوي الشرايين الموزعة عادةً على ما يصلإلى 40 طبقة من العضلات الملساء، تشكل حوالي ثلاثة أرباع سمكالجدار. في المقاطع النسيجية، تكون هذه العضلات أكثر وضوحاًمن النسيج المرن. ومع ذلك، فإن كلاً من الصفيحتين المرنتينالداخلية والخارجية سميكتان وغالباً ما تكونان واضحتين.

3.**الشرايين المقاومة** (**الصغيرة**)تتفاوت هذه الشرايين بشكل كبير في عددها وموقعها،ما يجعل من الصعب تسمية العديد منها بأسماء فردية. تتكون من مايصل إلى 25 طبقة من العضلات الملساء، وقليل نسبياً من الأنسجة المرنة.وبالمقارنة مع الشرايين الكبيرة، فإن الطبقة الوسطى (الغلالة الوسطى) فيهاأكثر سمكاً مقارنةً بحجم التجويف. أما أصغرها، والتي يصل قطرها إلى 200ميكرومتر وتتكون من طبقة واحدة إلى ثلاث طبقات فقط من العضلات الملساء،فتسمى**الشرايين الصغيرة.**تعُد الشرايين الصغيرة نقطة التحكم الرئيسيةفي كمية الدم التي يتلقاها العضو أو النسيج، كما سنرى لاحقاً.

في بعض الأماكن، مثل المساريق، توجد أوعية دموية قصيرة تسمى **الشرايين الصغيرة**[4](**قنوات الطرق الرئيسية**)تربط الشرايين الصغيرة بالأوردة الصغيرة مباشرةً،وتوفر مسارات مختصرة يمكن للدم من خلالها تجاوز الشعيرات الدموية. وسيتمتناولها بمزيد من التفصيل في سياق الحديث عن شبكات الشعيرات الدموية.

أعضاءالحس الشرياني

تحتويبعض الشرايين الرئيسية فوق القلب على تراكيب حسية في جدرانهاتراقب ضغط الدم وتكوينه(**الشكل 20.4**).

تنقلهذه المستقبلات المعلومات إلى جذع الدماغ الذي يعمل على تنظيم ضرباتالقلب، وأقطار الأوعية الدموية، والتنفس. وهي ثلاثة أنواع:

1.**الجيوب السباتية.**هذه هي**مستقبلات الضغط**—أجهزة استشعار تراقبضغط الدم. يتم رفعها على جانبي الرقبة.*الشريان السباتي الأصلي*،والتي تتفرع بالقرب من زاوية الفك السفلي، لتشكل*الشريان السباتيالداخلي*إلى الدماغ و*الشريان السباتي الخارجي*إلى الوجه. تقع الجيوبالسباتية في جدار الشريان السباتي الداخلي فوق نقطة التفرعمباشرةً. تحتوي الجيوب السباتية على وفرة من ألياف العصب البلعوميالليساني في الغلالة الخارجية. يطُلق على دور مستقبلات الضغطفي تنظيم ضغط الدم اسم*منعكس الضغط*،سيتم شرح ذلك لاحقاًفي هذا الفصل.

2.**الأجسام السباتية.**تقع هذه المستقبلات البيضاوية الشكل، التي يبلغ حجمهاحوالي 3 × 5 مم، بالقرب من تفرع الشرايين السباتية المشتركة، كماأنها معصبة بواسطة الأعصاب البلعومية اللسانية.**المستقبلات الكيميائية**—أجهزة استشعار تراقب التغيرات في كيمياء الدم. وهي تنقلفي المقام الأول إشارات إلى مراكز التنفس في جذع الدماغ، والتي بدورهاتنظم التنفس لتحقيق استقرار درجة حموضة الدم وثاني أكسيد الكربونفيه.$_2$و $_2$O مستويات.

3.**الأجسام الأبهرية.**هذه عبارة عن مستقبلات كيميائية تتراوح من واحدإلى ثلاثة مستقبلات تقع في قوس الأبهر. وهي تشبه في تركيبهاالأجسام السباتية ولها نفس الوظيفة، لكنها تنقل إشاراتها إلى جذعالدماغ عبر العصب المبهم.

[3]*تمدد الأوعية الدموية*=اتساع
[4]*ميتا*=ما وراء، التالي في سلسلة

> *a e q u i d i a n i s e x o r t i v u s p r o c r e a t u r ; e*
> *e m i t t i t u r . Z e p h y r u s v e r o , q u e m R o m a n*
> *a e s t i v i s o c c i . d u i s p a r t i b u s s u r g i t*

> Though the *e u r* is the east wind, it receives the name of *a p a r* when *i a s* it blows from the east in the summer time; but it is called *a p e l* when *t e s* it is produced from the equinoctial sunrise [sc. east]; it is *e u r* when it sallies forth from the harbour places of winter. And, of course, *z e y p h y r u s* which is known as *f a v o* in the Roman tongue, when it arises from the summer occidental region.

Apuleius translates the Greek names for the various East-West Ἄνεμοι or 'wind gods' (*V e n t i*) as follows: East (*v e n t u s*) = Εὖρος (*q u a e i n s d o h i e m a l i s p o r t i s*), ἀπαρκτίας (*c i u t m u e r u m o r i e n s*), Ἀπηλιώτης (*v e n u s n e f f u a e q u i d i a n i s e x*); West = Ζέφυρος (*F a u o n i u s t e r e n s d u r* ing summer). The term *a e q u i* is not found elsewhere and seems to be a calque of ἰσημερινός 'equinoctial'. In XII.317, we find more glosses: *A n a p h y s e - m a t a = e o , q u a s i p i d e r e i f t u u n s d o v e l h i a t i b u s t e r r a s o l* 'those (winds) which explode from ravines or from gaps in the earth and menace the upper regions' and *p r e s h t i e c r u m m a i o r , f e r v e n t i p r o r u m t e r r* 'when these (*a n a p h y*) are even more violently twisted, a terrestrial whirlwind occurs' (the Greek had been used as a loan-word in Lucretius earlier, *D R N* VI.424).

319: eurus [...] aequinoctialis orientis est This section (XIII.319) contains further glosses, however we must note that all of these are expropriations from Aulus Gellius, as outlined in ROCHETTE,[47] from his *N o c t e s* 2.22.3–26 *i c a e* The only difference in glosses is Apuleius' use of the more usual *s e p t e n t r i o* for ἀπαρκτίας, which Gellius had translated with the neologism *s e p t e n t r i o n a*

321–322 (*Mun.* 395a): si ignitum non erit fulmen, typhon vocatur Similarly, the section in XV.322 contains the naturalized technical terms *t y p h o n* (τῦφων) and *s c e p t o s* (σκηπτός), which are again glossed in Latin using a circumlocution, more precisely a 'descriptive equivalent' (cf. NEWMARK [1988], 83–84): *s i i g n i t u m n o n e r i t* 'If the bolt is not ignited at all, it is *v o c a t* called a typhoon' and *s c e p t o s g e n e r a l e o m n i b u s q u a e e s* 'Sceptos [bolts] is the general name for anything which falls from the clouds'. The form *c l a r i* (*c l a r a*) seems to be an Apuleian lexical innovation added to the section adapted from the *N o c t e s. A t t i c a e*

47 ROCHETTE (2005), 308.

323 (*Mun.* 395a): fallunt imagine irides et arcus et talia The lengthy section in XVI.323–325 discussing rainbows and coloured clouds is also taken from Aulus Gellius. The rainbow, *I r*, is glossed with Latin *a r c*, a common term (as Apuleius points out) with multiple uses in the sense of 'rainbow' attested in early and Classical Latin literature (e.g. in Plautus, Cicero, Lucretius, and Vergil). Of interest is Apuleius' use of *m e d i*, an abstract term Cicero had coined to translate the Greek 'median, middle' (μεσότης). The word is used in post-Classical Latin on numerous occasions by Apuleius, Lactantius, and Tertullian, but here it seems to have the more predominantly spatial meaning of 'the fact of being intermediate' (cf. *T L* 8.1554.67) rather than any mathematical sense. ROCHETTE summarizes this section by noting that only the Greek words appear as the technical terms for the various natural phenomena, except for the first instance of *I r* which is directly glossed with a *v u l* term.[48] All these technical terms are first transliterated into Latin orthography, then explained using a paraphrase. The adjective *m u l t i*, referring to Iris, is unique to Apuleius but can be seen as a simple variation on *m u l t* found earlier in Pliny (*N a.* 37.173). The noun *c r a s* 'thickness, density' is first in Apuleius and modelled on the established *c r a s* but does not correspond to any word in the original Greek. All of XVII.328, in fact, is an addition by Apuleius to the source text, ostensibly for dramatic effect.

327–328 (395b): vidi et ipse apud Hierapolim Phrygiae He begins by introducing the first-person observations of the narrator, then interpolates a story about living things which are close to the gaping fissures in the mountain: *s i v e i l l a , u t p o e t a e v o l u n t , D i t i s s p i r a c u l a c r e d i p r i* 'Either these fissures are, as the poets would like them to be called, the Vents of Dis, or reason tells us that they are rather lethal exhalations.' He proceeds to recount (absent from the Greek exposition) that the hermaphrodite overseers (*a n t i s t i*) of these fissures, if they dare to draw near to them, always keep their mouths turned upwards because 'they know what this evil is capable of: the poisonous air is denser and thicker lower down and so finds and afflicts lower creatures more readily.'[49] This is a creative addition by Apuleius, describing the menace of this natural phenomenon with an anecdotal narrative recounted in vivid language.

330 (*Mun.* 395b): saepe accidit ut nativi spiritus, per terrae concavas partes errantes, concuterent solida terrarum Through XVIII.330–331, Apu-

48 ROCHETTE (2005), 309.

49 XVII.328–329: *a n t i s t i t e s d e n i q u e i i p o s t o s a s n e t m i r i , n i d i p r i o r e s e s u p e r n a s e m p e r , a s d u c o i r l a l i t e r c l o e g , n i t a l e t i s u m f e r e s i t o v i r i a m a n e a r l i c r a s s i t , a t m f d e r i n f e r i o r a t e s q u o q u e f a c i l i u s a d i r e a t q*

leius translates the classification of earthquakes (σεισμοί, *motus*) and *rrae* uses more of these naturalized Greek loan-words; for example, the (σεισμοὶ) ἐπικλίνται = *epi c* becomes a loan-blend and glossed as an earthquake with an acute angular motion to the earth (*acutis ang*) compared *mobil* with the βράσται (*bras*), which have perpendicular effects on the earth's surface (*direct*). The ἀζηχωρίαι (*his se*) quakes collapse inward (sink-holes, *qui abstru*) and ῥῆκται (*ilde*) are those *quorum inpulsu d* ('which tear apart the earth by a shock'). Other loan-words such as *ostpaael m* and *niyace e* are also all naturalized into Latin and Apuleius eschews *verbum* translation, instead opting for circumlocutions. Whereas *ost* are *mot, quibus* ⟨*semel*⟩, the other *um qu* two circumlocutions contain lexical innovations, so *palmati* are those *motus* quakes by whose tremor objects shake without teetering into a dangerous incline (*pavitatione illa quae trepid*) *ant si* *Pavi* is derived from *pav* 'to shake, tremor', similar to the adjectival παλματίας (from πάλλω). This picks up the sense of the σεισμὸς παλματίας 'an earthquake with violent shocks', which also seems to have been a hapax in the original Περὶ Κόσμου. *Myc* (μυκῶνται) quakes are agitations of the soil accompanied by a foul odour (*taetri odoris*), with the abstract noun *oterr* *inqui* meaning 'a noxious outbreak of disorder, disturbance' (*OLD*.), though it does not directly correspond to any Greek term. The word μυκῶνται means simply 'bellowers' in Greek (LSJ s.v. μυκητής) and the nominal form appears to be rare.[50]

333 (*Mun.* 396b): cum in urbe ex diversis et contrariis corporata rerum inaequalium multitudo concordat The *cu*-clause contains the form *corpo* in the sense of 'formed into corporate society', here a novel usage by Apuleius, possibly rendering the Greek συνεστηκυῖα (396b37), similar to the adjectival *corp* in Cicero's *Tsi ma* cae us

hanc esse civilis rationis admirandam temperantiam The abstract *temper* in this section bears less of a psychological meaning applied to an individual, as it did in Cicero's use of the term, but a more abstract 'balance, equilibrium' applied to inanimate systems. It refers to the equilibrium of an entire civil society within, for example, a city.

336 (*Mun.* 396b): namque uvidis arida et glacialibus flammida In the neuter plural *flam*, we find a term attested only here and elsewhere in the *Metamo* and *Ho sDee so S*. As such it is of interest in terms of the debate over the authenticity of the *De Mu*, given no such specific lexical com-

50 Cf. Theoc. 8.6 and Corn. *de Natur* 22; Cf. the more common verbal form μυκάομαι.

monalities. The term is formed from *f l a m m i n e u s* 'flaming' and corresponds to the simplex θερμὸν (396b25), but whether we classify it as a genuine sense translation appearing first in this text is unclear. I have tentatively included it in the data for the purposes of this study.

336–337 (***Mun.*** **397a): perseverantiam vero amicitiae** The noun *p e r s e v e r a n t i a* in LXXII.336, like *t e m p e r a n t i a* above, appears to be a semantic extension, with the new sense of 'continued existence' as opposed to 'steadfastness, persistence'. Apuleius uses this new sense to emphasize the notion of 'preservation', from the Greek expression σωτηρία. Initially translated in the preceding sentence by *s a l u s*, the expression is reinforced with *p e r s e v e r a n t i a* so: *e a r u m q u e t a l i a s a l u t e m o p e r i m a c h i n a t a . p r i n c i p i o r u m i p s e v e r a n t i a m v e r o a m i c i t i a m* 'and from this [concord] [nature] contrived salvation to its work. It is thus the agreement of the first principles which has allowed for their concord, but the persistence of the amity between the elements is owed to the equal distribution of their very specific properties', rendering (396b4–5): καὶ ἐκ τούτων μηχανησαμένη τῷ παντὶ σωτηρίαν. αἰτία δὲ ταύτης [sc. σωτηρία] μὲν ἡ τῶν στοιχείων ὁμολογία. Note that Apuleius also employs Lucretius' translation of στοιχεῖον: *e l e m e n t u m*.

338 (***Mun.*** **397a): nunc pruinas hiemis circumreferentes** The participle *c i r c u m r e f e r e n t e s* in LXXII.338 is listed by the *O L D* (s.v. *c i r c u m f e r o* 'to bring around again') as a single form.[51] It probably corresponds to the participle ἐπάγουσα in 397a14. It is attested in four different manuscripts.[52] The compound form is not supported by Thomas (1970, 158), nor Beaujeu (1973, 141), who both print it as a prepositional phrase *c i r c u m* followed by two eleventh- and twelfth-century manuscript readings. Thomas notes a reading of *c i r c u m f e r e n t i* in certain *d e t e r i o r* codices but conjectures: '*s e c u m f e r r e h . l . m i n i m e c o n f o r t u m q u e s u m v e s e c u m r e f e r e n t e s*', with which Beaujeu agrees. In his recent edition of the text, Magnaldi (2020, 112) follows Thomas and Beaujeu, as Moreschini had done (1991, 170). If the term were a single derivation then it would likely have been an Apuleian innovation. One could logically make a case for a single morphological calque however, with the prefix *c i r c u m-* corresponding to the Greek prefix ἐπί- and the present participle *r e f e r e n t e s* rendering the present participle ἄγουσα. Apuleius was also fond of using compounds in *c i r c u m-*, with nearly 50 such words found in his corpus alone, some of which

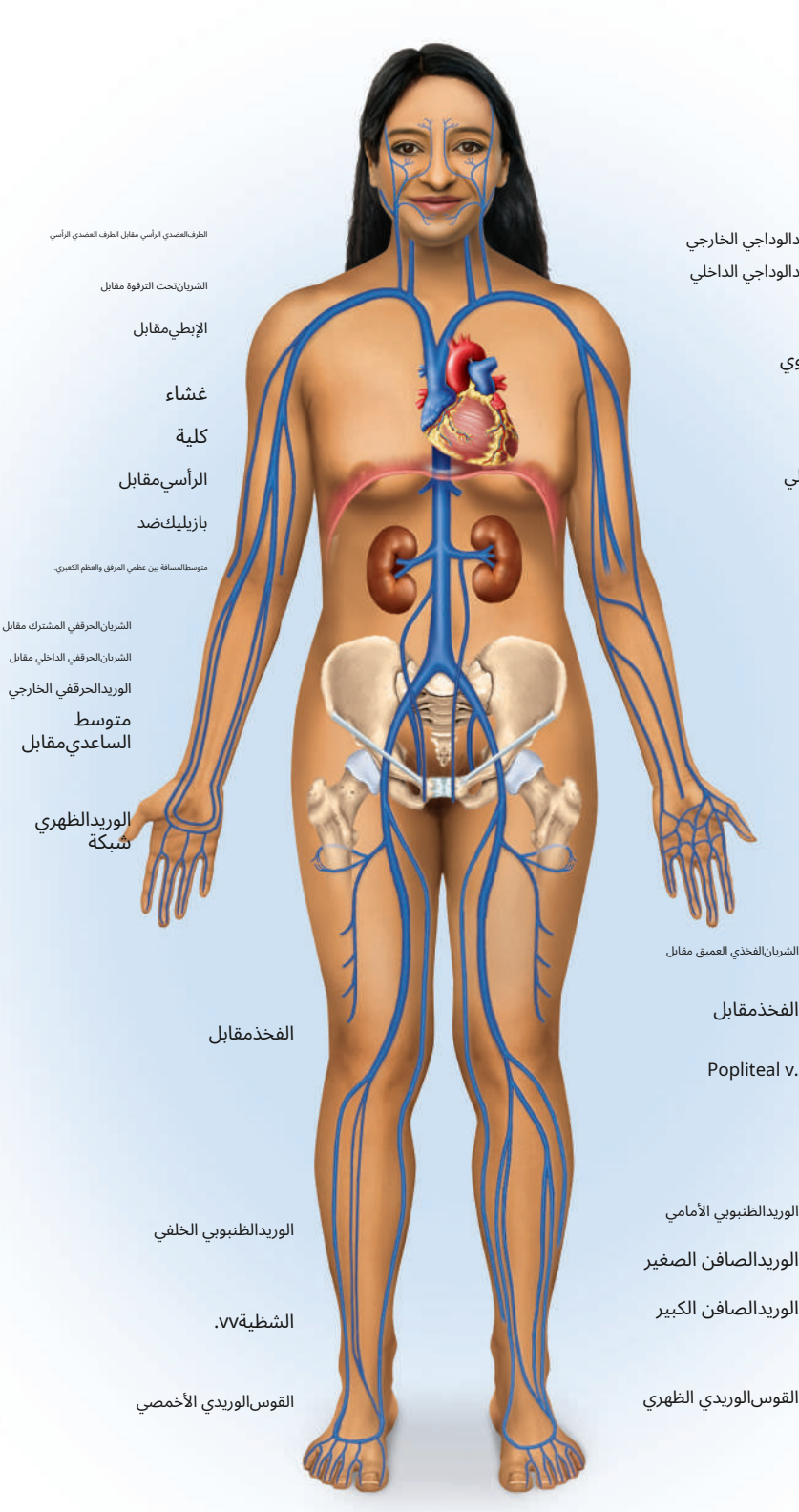
51 The *N e u e G e r l a n d* (Baier and Dänzer [1913/2013], s.v.) does not list it in Latin, nor the *T L L* (it is not recorded in its 'Zettelarchiv' either), which means the only reference authority is the *O L D* on the existence of this word.

52 Dating between the eleventh and thirteenth centuries.

appear to be first attested in Latin (e.g. *c i r c u)m* l include it as a potential lexical innovation, the weight of the various editors and their texts notwithstanding.

340 (*Mun.* 397a): videas [...] et aquarum agminibus concientem In XXII.340, the form of *c o n c* as an adjectival substantive is conjectured to be found only here with the meaning 'pregnant, teeming', approximately referencing the περιβλύζουσα 'boil or bubble all around' in the original (397a25: ἥ τε γῆ φυτοῖς κομῶσα παντοδαποῖς νάμασί τε περιβλύζουσα καὶ περιεχουμένη ζῴοις 'And the earth, bristling with plants of every kind and bubbling all round with running streams and being criss-crossed by animals'). The term here refers back to the *t e* being described as *s c a t e b r i s f o* and *t a i q u u m a u m a n a g m i n i b u s* . The participial meaning is found earlier in Velleius Paterculus (2.74.2.6): *a d a r m a c o n c i e n s m a g n u* in the *x e r c i* conventional sense of *c o n c* to rouse up, muster' (*O L D* ., s1b). Even if it were read with the basic meaning 'to stir up or set in violent motion' (*O L D s* ., 1a), the sense would be scrambled: 'stirring up with watercourses'? There are two explanations for why this particular meaning has been grafted onto the participial form in this section: (a) either the text is corrupt and to make sense of the sentence this new meaning has been imbued into *c o n c*, or *r e n s* (b) Apuleius was genuinely using the term in a new sense, unattested previously. BEAUJEU claims the text is corrupted, suggesting that Apuleius originally included a description of the ζῷα in 397a26 but a copyist possibly omitted it 'par distraction'.[53] The *T L L* suggests: '*f o r t* concipientem' (4.36.22), instead of *c o n c*. There are then two problems to address: a lexical one and a textual one. Taking the second issue first, one might argue Apuleius simply decided to conflate the two descriptions of the original: παντοδαποῖς νάμασί τε περιβλύζουσα καὶ περιεχουμένη ζῴοις. The first participle περιβλύζουσα conveys the 'bubbling with streams' and the second conveys 'criss-crossed all round by animals'. Since the most logical equivalent to περιβλύζουσα here is *s c a t*, he then *a* renders περιεχουμένη but applies it to the watercourses and springs instead of animals. Alternatively, we might infer that an error has been made in transmission, following BEAUJEU, with the original including animals. However, what of the sense of *c o n c* itself? In the sense of 'pregnant with', it is a hapax in Apuleius with the only analogue being *i n c i e n s* 'pregnant'. However, *i n c i e n s* is cognate with the Greek terms ἔγκυος and ἐγκύμων, whereas *c o n c* would not have such a lineage but seems rather to be a calque (*c o n* the present participial form of *c i*). Despite its unusualness, this form is attested in the

53 BEAUJEU (1973), 329.



الشكل 20.26 الأوردة الجهازية الرئيسية. تم توضيح الأوردة المختلفة على اليسار مقارنة باليمين من أجل الوضوح، ولكن جميع الأوردة الموضحة تقريباً تظهر على كلا الجانبين.

gi, where literary imagination was a stronger factor behind Apuleius' lexical innovation. However, in the *De Pl* (similar to the *De Mu*), the use of novel formations was impelled by a different motivation: the difficulty of conveying Platonic terms in Latin and the 'inelasticity' of the Latin language at the time.[71] This again invokes the recurring trope of the *egen* of Latin philosophical vocabulary, and authors such as Apuleius provide examples of the linguistic practices used in antiquity that enriched the Latin language and introduced new interpretations of technical Greek terms. How Apuleius introduces new terms in the *De Pl* echoes Ciceronian practices too; for instance, in the use of *quasi* and other introductory phrases, which formed a type of rhetorical *captatio*. But Apuleius differed in one important aspect: he felt less of a need to signal the introduction of new vocabulary and was more liberal in his use of lexical innovations.[72] REDFORS notes (1960, 51 n. 50) that it is '[e]twas überraschend' that Apuleius felt the need to apologize for his new terms in some instances in the *De Pl*, considering that in the *Apol* (discussed above), he had boasted about his ability to coin completely new terms and expressions. Apuleius' practice is superficially at odds with his hyperbole in the *Apol*, but REDFORS' contradiction can be resolved, as in Cicero's case, by viewing these 'apologies' as largely rhetorical, not meant as sincere concessions but to serve as communication strategies with his readership.

4.1 *The Opening Sections of the De Platone*

After a biographical overview of Plato's upbringing and philosophical career, Apuleius discusses the doctrines of Platonic philosophy, what he terms *consulta* (*Pl.* 1.189): *quae autem consulta Graeci dogmata uocant, quae ad utilitatem hominum uiuendi quae et intellegendi ordinauit*. 'Now as for the deliberations which we may call in Greek δόγματα, which (Plato) formulated for the utility of mankind and the method of living, understanding and speaking, we are going to begin the exposition here'. Cicero had rendered this Greek term with *decreta* and Seneca would use *decreta sciti* and *placita* (*Ep.* 95.10). Apuleius chooses to begin with Platonic physics.

71 BERNHARD (1927), 329.

72 RAMSEY (2017), 46–47: '[W]hereas Cicero appears to regret using such terms and makes it clear that they will only suffice until a more suitable way of conveying the concept becomes apparent, Apuleius liberally applies his own new terms to describe Platonic concepts in a way that suggests they are intended to be definitive, often when a suitable established Latin term already exists.'

190: deum et materiam inabsolutam, informem, nulla specie nec qualitatis significatione distinctam, rerumque formas, quas ἰδέας idem vocat Apuleius then explains that Plato saw three primary principles or elements (*i n i*): God (*d e u*), uncomplete matter (*m a t e r i a m i*), and forms and *l u t a m* distinguished by no feature nor any mark of quality, and the Forms (*f o r m a e r e r*), the form which he gives the Greek ἰδέαι. This is the 'Trinity' of Platonic metaphysics: the Creator, the Receptacle, and the Forms, all discussed in dialogues such as the *R e p u*, *Ti m a e u s*, and *P h a e d o*. For an interesting analysis of Apuleius' terminology regarding Platonic Forms in this work, see FLETCHER (2015). What needs to be noted at this juncture is Apuleius' terminological *v a r i a t* for the Platonic *f o r m* and the associated adjective and verbs *i n f o r m i s c o n f o r m i a n r f e o*) rder demonstrates his understanding of their duality (and, importantly, their causality) between transcendent *e x e m p l a r* and immanent *i m a g* or *fi e g u r*, all terms he uses at different points throughout the work.

is unus, ait, ἀπερίμετρος, genitor rerumque omnium exstructor, beatus et beatificus In the same opening section of the handbook, Apuleius begins his summary of Plato's Divine Creator with the Greek term ἀπερίμετρος, unattested before this work (later found in Eusebius of Caesarea),[73] defined as 'non circumscribed, immeasurable' (*D G*, *s.v.*) and provides echoes of Ciceronian translation, referring to God as the *g e n i t o r r e r u m q u*, *b e o a n t n i s u m e t b e a* 'the father of everything, the constructor, blessed and blessing' (cf. Cicero's *T i m a e u s i s c d e u s i l l e a e t e r n u s h u n c p e r f* and 47 *g e n i t o r*, etc.). The Greek term does not appear to be Platonic, though may have been an adjective later derived from Plato's ἀπειρία (cf. *F i. n* 1.21: *i n f i n i*, *q u i a* ἀπειρία *p r s o a c*). *a n t*

quem quidem caelestem pronuntiat, indictum, innominabilem [...] ἀόρατον, ἀδάμαστον Apuleius supplements what appears to be a coinage, *i n n o m i n a b i l*, with an established Latin adjective, *i n d i*, followed by Greek adjectives used by Plato: *u t a i*, ἀόρατον, ἀδάμαστον. These Greek terms are used as ornamental embellishments and left untranslated to convey 'infinite, invisible, unbroken', as he had done in his literary works elsewhere for similar ornamental effects.[74] The reasoning here merits some discussion. As ROCHETTE notes, except ἀόρατον, neither ἀπερίμετρος nor ἀδάμαστος seem to be Platonic terms (the former Homeric, the latter possibly borrowed from the vernacu-

73 ROCHETTE (2005), 294–295; FOWLER (2016), 153; DAL CHIELE (2016), 131.

74 See e.g. the eleven Greek loan-words left untranslated in the *A s c.*, cited in ROCHETTE (2005), 296 n. 21.

lar).[75] On the one hand, Apuleius could have straightforwardly translated the Greek adjectives into Latin but, conversely, he would have sacrificed the Greek flavour of the original Greek senses. Another option could have been to use the adjectives but to gloss them, as he does elsewhere (especially in the *De Mundo*). It seems that he preferred to leave the Greek untranslated to preserve the original Platonic flavour of the descriptions of god, whilst complementing them with new Latin adjectives in the same section (*beata* and *incuiusmodi inabilis*).[76]

191: materiam vero improcreabilem incorruptamque commemorat Apuleius introduces the neologism of *improcreabilis* 'incapable of reproducing' to describe Plato's concept of the 'Receptacle' (χώρα, *Ti.* 50c–51b). Plato uses the terms ἀνόρατον [...] καὶ ἄμορφον 'invisible and unformed' in *Ti.* 51A to describe it, however, there is no alpha-privative corresponding to Apuleius' *improcreabilis* in this section of the work. Calcidius would later use *informis*, *carens* and *qualitate* to describe the Receptacle (*Ti.* 50c–e; *Com.* 308 and 312), but the closest description he gets to Apuleius' description is with the phrase *ipsa quidem in nihil* 'The Receptacle is transformable into nothing else'. In *Ti.* 52A, we find ἀγέννητος 'unbegotten, un-generated', which refers to Forms as objects of νόησις, but not the Receptacle itself. Might Apuleius have been thinking of this same term in any case? Apuleius' understanding of the Receptacle is primarily as *mater* (or more precisely, *materia inabolita*), a claim that is, itself, not clear in Plato's *Timaeus*.[77] It may have been that Apuleius gathered together proximate descriptions of Forms with expressions such as 'invisible, unformed, ungenerated, etc.,' and applied them to this notion of 'space', hence the creation of *improcreabilis*, whence also *Ti.* 52A. I have tentatively included it as a morphological calque of ἀγέννητος in **Appendix 3**.[78]

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75 Rochette (2005), 295. See also the comment in Dal Cheile (2016), 132.

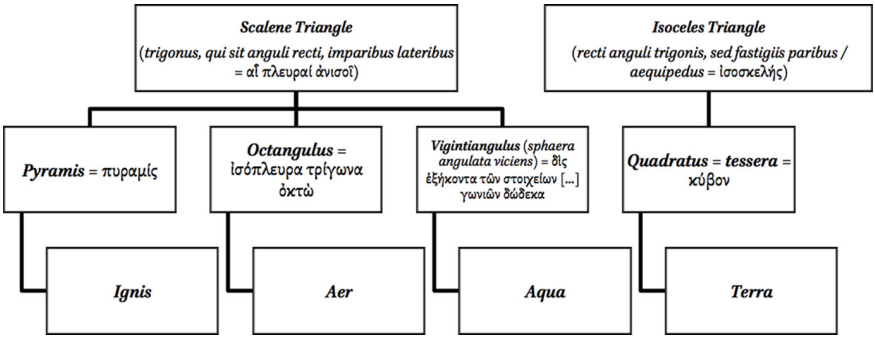
76 The arguments posed by Marchetta (1992), 207–209 and Rochette (2005), 295, that it can be assumed Apuleius left these terms untranslated because there were not yet suitable equivalents in the Middle Platonic tradition in Latin, should be queried. We can observe a number of lexical innovations Apuleius coined elsewhere (e.g. in the *Mun.* and in this translation) for Greek terms with no pre-existing Latin equivalent, most strikingly in his mathematical vocabulary (discussed below).

77 So Zeyl (2017): 'There has been considerable discussion about whether the receptacle is to be thought of as matter, or as space.' See also the discussion in Dal Chiele (2016), 132–133. Cf. Calcidius' conflation of *silua* 'matter' and *prima materies* 'prime matter', *prima subiecta materia* these latter terms in reference to the Receptacle now taking on an Aristotelian sense of πρώτη ὕλη (see van Winden [1965], 146; Bakhouche [2011], 862; Magee [2016], 719).

78 Note also the *TLL* (1.1.694.84) identifies ἀγέννητος as the source.

4.2 *Apuleius' Mathematical Vocabulary*

195: prioris [...] formae tres species exsistere; pyramidem, octangulam et vigintiangulam sphaeram As we noted in Cicero, mathematical vocabulary by itself is not 'philosophical' vocabulary strictly speaking, but a much more self-contained technical vocabulary. However, it is worthwhile to note some features of Apuleius' translations of such terms in the *De Platone* (*Plat.* II.195–196), Apuleius translates the expressions for the Platonic solids, as outlined in the *Timaeus* (*Ti.* 55a–b), and thus is forced to render technical geometric terms into Latin for the first time, turning to lexical innovation.[79] From the section, we can deduce the following scheme: Apuleius 'compacts' the Greek into single Latin substantives[80] to characterize the three-dimensional solids and uses the lexical innovations *octangulus* 'octahedron' and *vigintiangulus* 'icosahedron' instead of ἰσόπλευρα τρίγωνα ὀκτὼ (*Ti.* 55a) and γωνιῶν δώδεκα (*Ti.* 55a–b) respectively. These are all sense translations or loan-words rather than morphological or semantic calques.



A question of accuracy arises[81] with *vigintiangulus*. It denotes literally 'twenty-cornered, twenty-angled', but Plato's regular icosahedron is twelve-angled (γωνιῶν δώδεκα). Apuleius later reinforces the point with the phrase *sphaera angulata*. The shape *vigintiangulus* seems to more closely describe the regular dodecahedron (twelve faces, twenty vertices), but this 'fifth element' is not discussed in the *De Platone*, unlike in the *De Mundo*, where it is described as 'aether' (I.291).[82] A similar translation error occurs with *octangulus* (*angulus*

79 Also discussed briefly in Dal Chiele (2016), 39 n. 119.

80 Cf. Langslow (2000), 432 who uses the phrase '"compact" ("noun-based") style of writing'.

81 See Beaujeu (1973), 261; Dal Chiele (2016), 134.

82 It is interesting to compare Apuleius' approach to later Renaissance translations of Euclidean geometric terms (discussed briefly in Kelly [1979], 136).

octahedron has six vertices, not eight). In addition to sense translations, the term *a e q u i* 'equal-faced' is a morphological calque of ἰσοσκελής and is unique to Apuleius, with later incarnations of the same translation, including *a e q u i* , found in Boethius.

4.3 *Senecan Echoes in Apuleius' Glossing*

200: naturasque rerum binas esse, et earum alteram esse, quam quidem δοξαστὴν appellat Apuleius next provides us a revealing aside:

> According to Plato, things have two natures: one which he calls δοξαστὴν 'a thing capable of an opinion', which is able to be seen by the eyes and touched by the hands, the other, which communicates itself to the mind, conceivable and intelligible (*c o g i t a b i l i*) – but forgive me *l l e g* for the novelty of the terms (*n o v i t a t*) which we are employed on account of the obscurity of the subject matter.[83]

The terms *c o g i t a b i l i s* are not first attested in Apuleius. Both appear in Seneca's *E p* 58.16 and 124.2 respectively, as noted by Beaujeu.[84] It is possible the noun *n o v i* may mean 'unusual' here (*O L D* ., s.v. b), however the general semantic range of the word covers 'newness, novelty' etc. The phrase also directly evokes similar phraseology to Lucretius (1.136–139).[85] The two options I see in this aside are as follows:

a) Apuleius knew of these adjectives from Seneca's usage of them but claimed they possessed *n o v i* or 'strangeness' and felt the need to apologize for using them; or
b) He independently coined these terms (from the basic pattern of *c o g i t o* + *- b i* and *i i n s t e - l b i*) and did apologizes for their novel use.

The former is more likely given that the context in which *c o g i t* is used by *l i s* Seneca covers the same subject matter as discussed by Apuleius here (Plato's division of οὐσία or, as Seneca translates it, *q u o d*).[86] As Moreschini (1978,

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83 *P . l* X.200: *n a t u r a s q u e r , e e r t u e m a b r i u m m a c s | q t u s e a r m u q n u d a x s d s v e m a p p e l l a t i l l e e t q u a e v i t a e l r t i e q r u c a m e l v i s n e i t a , a t d i t n i m g i c o g i t a b i l e m , d e t t i u n r t e e n d i l m a y g i h b i i , d e m u i n t o d s i c u r b a t i v i e n t i*

84 Beaujeu (1973), 266.

85 1.136–139: *n e c m e a n i m i f o h u s c l u r a r e p e r t a | d i a f f o r e i n l u s t r a r e e s , | s m u l t a n o v i s v e r b i s p r a e s e r t i m c | p a m o s p t e a r g e g e d s u r e m a n t e m l i n g n o v i t a t e m*. See also Beaujeu (1973), 266.

86 *E p* 58.16: *n u n c , q d u o d t i , b r i e p r e q r u a t i o n s r a i d o q u a e , i c n u s m e q x u m o s d u o n s t P l a t o p a r t i a t q u u r o . d p e r e s i t m u i m s i u l n l e u c d t a c t u n e ; c u l l o s*

206) suggested, Apuleius seems to have taken up technical terms which were only nascent in Seneca's time: 'Sembrerebbe [...] che Apuleio avesse sviluppato e diffuso l'impiego di certi termini tecnici che con Seneca erano ancora agli inizi.'

4.4 *Comments on Book 2 of the De Platone*

204: ex eo dividi terrenum atque terrestre—sic enim ἔγγειον et ἐπίγειον censui[t] nuncupanda Apuleius then translates the terms ἔγγειος and ἐπίγειος (the distinction in Greek found in Pl. *R e .* 546a) with *t e r r a n u s* and *t e r r e s t r i* at XI.204, both established Latin terms but here possibly used with some further nuance than previous attestations. An interesting feature in this section is the gerundive *n u n c u* , expressing a type of obligation on Apuleius to render the Greek terms with these specific Latin equivalents. Does this mean that he felt an obligation to use these terms here with more particular denotations? That is, *t e r r* (ἔγγειον) now refers to something living *i n* the earth (e.g. trees, whose roots are in the ground) and *t e r r* (ἐπίγειον) now refers to something living *u p o n* the earth (e.g. animals such as humans, quadrupeds, etc.)? In Cicero, *t e r r* denoted an 'earthy element' or something 'of the earth' (e.g. *N . . 2.* 25; *T u s .* 1.40 and 1.62) and *t e r r* denoted something land-based or 'of land' (*T i m a* 10). Plautus had used *t e r r* broadly, contrasted with *c a e l e .* 346). It is possible the gerundive hints to the reader that Apuleius is almost obligated to use these Latin terms in new ways to translate Plato's distinction between ἔγγειον and ἐπίγειον. I have not included these meanings in the data as semantic augmentations but it is, nonetheless, worth considering that Apuleius might have been using them with subtly new senses, given the context.

ultramundanus, incorporeus In XI.204, it appears that Apuleius coined the term *u l t r a m u n d a n u s* , possibly as a translation of the Greek term ὑπερουράνιος from Plato's *P h a e* (247c).[87] The Greek is first found in Plato and corresponds morpheme for morpheme with Apuleius' term (*u l t r a-* = ὑπερ- + *m u n d u s* = οὐράνιος). The term would later be used by Martianus Capella (2.185) in a similar description of the one 'Divine God'. In Cicero's *T u s c u l a n a e D i s p u* (5.108), we first find the term *m u n d a n u s* likely translating Socrates' recorded self-description of κόσμιος or κοσμοπολίτης.[88] This is a term found in the Ps.-

c o g i t a . Note also that in this letter, Seneca (like Apuleius here) apologizes for the use of neologisms to render the Greek notions of 'being' (see also BEAUJEU [1973], 266).

87 BEAUJEU (1973), 271 and DAL CHIELE (2016), 138.

88 See e.g. *T L L s . v . m u n d a n u s* 1162.44–47. For Socrates' dictum, see e.g. Plutarch *D e E . x i l* 600; Arrian. *E p i* 1.9.1.

Apuleian *Asclepius* 12. Apuleius might have seen this appellative, locational sense of *mundanus* as someone who is a 'citizen of the world' as a useful base upon which he could form this new term to describe the Divine God.[89]

220: **bonorum [...] alia eximia ac prima per se ducebat esse** In the beginning of Book 2 (IV.220), Apuleius lists four virtues found in Plato's *Laws* 631c (φρόνησις, δικαιοσύνη, σώφρων ψυχῆς ἕξις, ἀνδρία), and uses *varia* to provide their Latin equivalents. In this first instance, he writes *prudentia iustitia temperantia* and *fortitudo*. In the next sentence, he uses *continentia* instead of *pudicitia*.[90] We saw in *De Mundo* (333, and 337) that Apuleius used the substantive *temperies* in a unique way with the sense of 'equilibrium'. Here, he turns to ethical terminology to convey Plato's σώφρων ψυχῆς ἕξις or σωφροσύνη. In Chapter 2, we first noted that Cicero had rendered this expression with *temperantia* in his *Tusculanae* but also used alternatives to capture the Greek technical meaning, such as *frugi*, *modestia*, and *modus*. We *pudicitia* see here a similar technique employed, using both *pudicitia* and *continentia* together. *Pudicitia* seemed commonly associated with chastity (e.g. Nonnius p. 440, 2: *castitas et pudicitia paria deputa turpium libidi*), but this is only one dimension of Plato's *as* σωφροσύνη. As DAL CHIELE (2016, 143) notes, these terms designate self-control and sobriety in every aspect of life, not only the libidinal: 'In questo contesto, i sostantivi *pudicitia* e *continentia* designano un autocontrollo e una sobrietà validi a tutti i livelli, non soltanto in relazione alla sfera sessuale.' So *continentia* functions not just as a *varia* of *pudicitia* for stylistic reasons but, more importantly, to broaden the sense of the Greek to capture the Platonic virtue under discussion more precisely.

226: **in eius comitatu[m] secuntur indignatio et incommobilitas—ἀοργησίαν sic interim dixerim** In IV.226, Apuleius uses the term ἀοργησία 'impassivity, lacking in gall', found first in Aristotle (*EN* 1108a8 and 1126a3). The term is translated with the familiar double translation technique: *indignatio incommobilitas* 'indignation and impassivity'. The latter appears to have been a hapax and probably a lexical innovation derived from *in-* + *commovere* + *-bilis* + *-tas* (OLD s.v.), the suffix *-bilis* denoting an ability to perform the verbal base[91]

89 For the sense of the suffix *-anus* as 'von Appellativen als Ortsbezeichnungen und Personengruppen' see LEUMANN-HOFMANN-SZANTYR, 1.324.

90 Note *TLL*, s.v. *pudicitia* (10.2.2487.80): *inter quattuor illa* [...] *virtutes* (*postea continentia*) *nentia appellat*

91 This is one of its many senses, for a wider view of its semantic range see KIRCHER-DURAND (1991), 121–122 who argues its general sense is that of a 'semic constant, that of non-actualisation.' See also LEUMANN-HOFMANN-SZANTYR, 1.348–350.

and *-tor* nominalizing the term into an abstract noun providing the sense of immobility or indecision concerning the passions, which Apuleius then highlights with the description: *ea stupore dat. Apuleius could have mobil* used an existing Latin abstract to render the concept of ἀοργησία, for instance, *aequ* (see e.g. Cic. *Tus.* 3.19.47), but he instead preferred a more (formally) literal creation to calque the Greek term closely. In VII.229, ὁσιότης 'piety' is rendered with another feminine abstract *religi* found first in Apuleius. He then seeks to further clarify the use of the word by repeating it in the following terms: *quarum religiositas deum honori ac su*

231: usus nulla ratione collectus—sic enim ἄλογον τριβὴν elocuti sumus In VIII.231, Apuleius broaches the topic of the ἄλογος τριβή, which Quintilian had described (*Inst.* 1.8.10) as an 'irrational knack' (*irrati*). Apuleius translates it as *usus* lates it as *usus nulla ar*, which he claims is part of the 'science of flattery' (*adulandi*), a branch of rhetoric that purports to persuade what it cannot teach (*quae persuasum vel*). This ἄλογος τριβή or *adulandi* is also given the more niker *captatrix veris* 'she who strives after verisimilitudes'. The female agent noun contrasts with the earlier *disciplina con* 'The Counter*emplatrix*: the study of *orum* good things'. The latter is found in Celsus but is rare, the former appears to be Apuleius' own coinage.

241: ⟨at quae⟩ ὀλιγαρχία dicitur Here we find the Greek socio-political term ὀλιγαρχία, which Apuleius defines with a lengthy descriptive equivalent translation rather than coining a new term outright or a meaning from an existing term. So Apuleius describes it: *⟨at q⟩uae ὀλιγαρχία dic, id est ut ita nascit cum, propter pessimum pastum eius parti st, [at]* ***rationabil⟨itat⟩i*** *s* but what is named *centi* ὀλιγαρχία thus develops when, because of poor nourishment given to the part of the Soul that consists of desires, states of rationality and irascibility are possessed'. The double translation *ratio / ra* and *tiro* ans as he re to it by the latter term being first attested here.[92] In the same section, Apuleius translates Plato's φιλοχρήματον καὶ φιλοκερδὲς (*Rep.* 581a) with *accipitrem pec* and *lucri* respectively, the former being a phrase borrowed from Plautus' *Per* (4.3.99) (*OLD s. v.*, 1b) and the latter likely Apuleian, based on Plautus' *turpilu* in the *Tri* (*nom*).[93]

92 The *TLL* notes that there is a textual issue here in reading the genitive *ration* for *bilitat* *ratio* (per Kozio l's reading) but does not adopt it. BEAUJEU has *ratio*, which I follow here. If *ratio* is correct, it would be the first attestation of the abstract noun in Latin. See *TLL s. v.* (11.2.1123). *nabilis*

93 See *TLL s. v.* (7.2.1714–47) and BEAUJEU (1973), 299 n. 248.1.

4.5 *Summary*

The text of Apuleius' *De Platone* is not a translation work but an introductory manual of Platonic expressions and concepts designed for students or Latin readers interested in Plato. We saw that it became a work where many important Platonic terms required Latin new equivalents. Multiple lexical innovations were introduced to render Greek terms, some of which were never attested in Plato's dialogues but came from later sources, providing us useful evidence of Middle Platonic terminology in Latin. In other instances, Apuleius used established terms but through techniques of *varitio* to translate well-known Platonic terms, such as σωφροσύνη, more accurately for his readers. This echoed the techniques employed by Cicero, as we discussed in Chapters 2 and 3, and provides evidence of a clear continuity of techniques employed by authors of different periods throughout the tradition of Latin philosophical translation. In other cases, such as when Apuleius needed novel geometrical terms as translations of Greek phrases, he preferred to 'compact' the Greek into Latin substantives, often sacrificing accuracy. We can judge the *De Platone* as an important work in the Latin philosophical tradition, not simply for its evidence of Middle Platonism in the Roman Empire, but its contributions to Latin philosophical vocabulary through the translation of Greek technical terminology.

5 Apuleius' *Peri Hermeneias*

The attribution of the *Peri Hermeneias* 'On Interpretation' to Apuleius is contested and beyond the scope of this chapter, but some comments should be made before proceeding.[94] The contributions of Londey and Johanson (1987) and Ramsay (2017) to the study of this work are the principal sources I have relied upon to attribute this work to Apuleius for the purposes of this study. Ramsay notes that the text is 'always ascribed to Apuleius in the manuscripts',[95] however, the bulk of her study does not take a side as to whether attribution to Apuleius is correct. Londey and Johanson (1987, 3) argue that 'there is no real doubt that the work dates from the second century AD.'[96] The work certainly does not sit well stylistically with the Apuleian corpus, but this might be due to its aim being different from his other philosophical works, serving rather as a technical handbook of instruction in logic rather than a more general overview of, for instance, Plato's doctrines in the *De Platone*.

94 See the useful overview in Hijmans (1987), 408–409.

95 Ramsay (2017), 16; see also Moreschini (1991), 189 in the critical apparatus.

96 Although see Huby (2007), 61.

intend to leave the question open, but aim examine the methods of translation of Greek logical terms in the work for comparison with the earlier selective commentaries, and for completeness.[97]

The title of the treatise shares the Greek name with the second text of Aristotle's *Organon* of the same title, also commonly named *De Interpretatione*. It is a complex text covering the relationship between logic and language. There is, therefore, a significant amount of definitional vocabulary, both logical and linguistic: propositions (quantity, quality), modalities, symbols, nouns, and verbs. RAMSAY's doctoral thesis deals in part with the introduction of new vocabulary in the *Peri Hermenias* (2017, 43–58), and LONDEY AND JOHANSON's chapter on Apuleius' technical writing in the *Peri Hermenias* (1987, 51–61) is also highly instructive for the data collected in this chapter. The lexical innovations of the *Peri Hermenias* have been included in **Appendix 3**. However, some general observations on the text's approach to lexical innovation here will be useful.

Lexical innovations found in the *Peri Hermenias* are overwhelmingly morphological calques of Greek originals, as shown in the selected examples below:[98]

Apuleian term	Greek original
ab-dica	ἀπο-φάτ-ικός
aequi-pollentia	ἰσο-δύναμ-εος
declar-ativus	κατ-ηγορ-ικός
pro-tenses	πρό-τασ-ις
rogata-um	ἀξίω-μα
sub-stitutivus	ὑποθετ-ικός

97 Debates concerning authenticity should not detrimentally impact the scope of examination. To avoid the work altogether is unhelpful for the purposes of this study, i.e. to collate a large enough sample of data as possible in supporting the arguments advanced regarding lexical innovation in Apuleius' philosophical corpus. As to the question of whether the *Peri Hermenias* forms any part of the *De Platone*, I agree with both RAMSAY (2017, 49) and HOENIG (2018, 102–103 n. 1), mostly on lexical and stylistic grounds, that any theory attempting to link the former as being part of the latter is, by now, a discredited one. See also SULLIVAN (1967), 9–14 for a useful overview of the authenticity issue.

98 Terms have been sourced from BALDASSARI (1986), RAMSAY (2017) and my own research. All references are to the page and line numbers of the Teubner edition of THOMAS (1970).

The near-exclusive use of morphological calquing in translating Greek logical terms (and the heavy reliance on the *-ivus* suffix in forming Latin terms) is disproportionately found in this work more than anywhere else prior to Boethius' translations of Aristotle's *Organon*. We find them occasionally in his other philosophical treatises, but approximately 40% of all Apuleian calques of Greek philosophical terms collated in **Appendix 3** are found in the *Peri Hermeneias* alone. Londey and Johanson (1987, 53) note that while there was rapid Latinization of Greek terms around Apuleius' time, he seems to have been 'something of an innovator' himself in his choice of technical terminology in the *Peri Herm*. Below we will look at some examples of this innovation in practice.

The glosses in this work are illustrative. For instance, at the beginning of the treatise (190.2–3), Apuleius writes of the *pronuntiatum* 'statement, proposition', itself apparently a lexical innovation, likely corresponding to ἀξίωμα (or ἀξιωματικός, cf. *TLL*., s.v. 10.2.1917.13). He then lists a brief lineage of terms employed by different Latin authors and the Greek originals: *quam vocat Sergius Varro pr, Gallicus quidam, nam ut nonnulli putant, ἀξίωμα, ego verbum verbo tum prolatus sim; fuit enim lituanorum sat mos et nunc hic* 'which Sergius (Plautus?) calls *effatum*, Varro *promulgationem*, Cicero *enuntiatum*, that is the Greeks either πρότασις or ἀξίωμα, but which I will call, using a word-for-word approach, *prolatum*. It may be said more ordinarily with *propositum* however.' The important points to note here are the following:

a) Apuleius is placing himself directly within a tradition (whether rhetorical-philosophical or otherwise) with specific intellectuals (e.g. Cicero, Sergius [Plautus?], Varro);
b) He acknowledges the Greek originals (thus glossing);
c) He notes the established word: *propositum* (thought see Londey and Johanson [1987], 35–39);
d) Nonetheless, he coins two terms: *prolatum* and *rogamentum*, the former[98] a morphological calque of πρότασις,[99] the latter a sense translation of ἀξίωμα;[100] but
e) Both of these are referred to as *verbum* translations.[101]

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99 See Londey and Johanson (1987), 39.

100 The root of ἀξίωμα is ἀξιός 'worth' (see LSJ s.v.) but it also carries a secondary meaning of a 'request, petition' (LSJ s.v. ἀξίωμα II.3), which Apuleius might have had in mind when using *rogamentum* (from *rogo*, 'to ask, beg, request'). Note also both *-mentum* and *-men* are neuter suffixes denoting the result of an action and are considered cognate. See Ramsay (2017), 95: 'It is less obvious how rogamentum was derived from ἀξίωμα if this was the intention. LSJ compare the verb ἀξιόω to the Latin verb *posco*, which could be seen as a synonym of *rogo*. The author may simply have in mind the very first stage of dialectic

LONDEY AND JOHANSON (1987, 54–55) discuss Apuleius' use of these terms to translate πρότασις. They suggest the following: *rogamen* was chosen to capture the interrogative aspect of the Aristotelian πρότασις, yet this was too narrow an aspect for the term to serve as a useful equivalent long-term (1987, 54): '[W]e can understand why *rogamen* also fell from favour. It must have seemed to put the emphasis so blatantly on the interrogative aspect that it could not sit very happily with the statemental core concept.' Apuleius had other options however, using *prota* as an etymological equivalent to πρότασις to capture the sense of something 'held out' to an interlocutor for their agreement. LONDEY AND JOHANSON (1987, 54) see problems with this equivalent too however, because: 'Apuleius makes it clear in [the *Peri Hermenei*] that the propositional concept he is after has being true or false as an integral part.' They conclude that Apuleius might have decided that *prota* was 'too close to the very concretely conceived Aristotelian protasis. His Latinization was too good a translation to fit what he really wanted.' As a result, they see *propa* as Apuleius' favoured choice, not simply because it was the more established term by usage but for conceptual reasons too (1987, 55): '[I]t is quite likely that Apuleius would have thought that the etymology of *propa* made it just sufficiently ambiguous to catch not only his statemental core-notion but the interrogative aspect of the protasis as well.'

These are all useful observations about Apuleian *variatio* in the choice of a Latin equivalent for a Greek technical term, but I suggest here that such a practice demonstrates strong echoes of Ciceronian translation. We can recall that this involved an interpretative approach to the Greek term, looking at meaning not only between discrete terms but additionally in the context of the philosophical system as a whole. Apuleius appears to have been acutely aware that Aristotle's πρότασις was not simply statemental (*pronuntiatum*), something claimed or held to be true, but something proposed to one interlocutor for their response, i.e. a claim that was either true or false and thus subject to a disputation. This is why LONDEY AND JOHANSON referred to the Greek term as a 'double-aspect concept' (1987, 40). For Apuleius to use *propositio* as the sole equivalent from the outset would limit his interpretation of these

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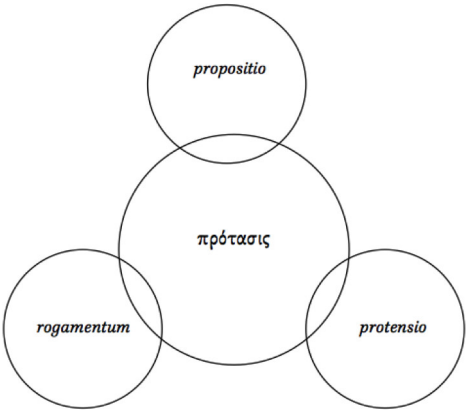
exchange where the interlocutor is first presented with a question which he must accept for it to become a premise of the syllogism. This seems likely in light of the fact that the author clarifies his use of *propa* later where he makes it clear that a question is being posed which must then be accepted as true by the interlocutor in order for the syllogism to proceed'. See also LONDEY AND JOHANSON (1987), 39, 54.

101 As we have seen earlier, an explicitly Ciceronian turn of phrase, see *Fl.* 3.15 and 3.52; *Luc.* 31 and *To.* 35. See also POWELL (1995a), 276 f.



two aspects to an ambiguous Latin term. Instead, Apuleius adopts a Ciceronian approach and demonstrates both etymological and conceptual translations (both his own innovations) to the reader to capture the dual aspects of the Greek term, only to settle on a more established Latin term. This we witnessed in Cicero's translation of ἀξίωμα and σωφροσύνη and the practice, I suggest, continued in earnest in Apuleius (see diagram above).

Apuleius provides the reader a 360-degree view of the Greek term, cycling through different possibilities, some literal calques, others more established or sense translations. In this case, Apuleius has not failed or abandoned insufficiently accurate terms, but rather deployed them strategically for the fullest translation in Latin. By associating the established term for 'proposition' with his own *rogamentum* and *protensio*, the reader now imbues a new and more nuanced sense into *propositio* that assists Apuleius' aims in the *Peri Hermes*; that is, to demonstrate the 'double-aspect' sense of πρότασις in the context of propositional logic. However, Apuleius does something more than Cicero in his translation: he uses direct appeals to authority to translate the senses of both ἀξίωμα and πρότασις. He cites Varro, Cicero, and a particular 'Sergius' for the use of *prolocutio*, a *terminus technicus* of some form which he adopts throughout the rest of the text. These are not cited unthinkingly, but serve a precise function to add further nuance to Apuleius' conceptualization of the Greek terms in Latin for maximum interpretative effect.

In the next section of the text, we find *subiectio* (for ὑποθετικός), another morphological calque, introduced with *condicio*, which Ramsay (2017, 98) notes is used by Apuleius' contemporary, a jurist named Gaius (c. 130–180 AD) in a legal context ('with conditions attached').[102] Apuleius' technique of double

102 See *OLD*.; also Londey and Johanson (1987), 75.

translation with an established term + his own innovation is, as we have seen, a common one in his philosophical works, as it was in Cicero.[103]

The terms *q u a l* and *q u a n t* are familiar technical vocabulary, especially with the former—once coined to render Plato's ποιότης by Cicero, now used as features of logical propositions. LONDEY AND JOHANSON (1987, 51) and RAMSAY (2017, 102) argue both terms are first used in this sense, specifically regarding 'determinables' (e.g. colour, whose determinates are 'blue', 'red' etc.). One can find similar, though not identical, usages for *q u a l* in Quintilian (see *O L D* ., s2b–c). We might assume that these correspond to ποιότης and ποσότης, given they are used in various works by Aristotle (e.g. *M e t*. 1028a19), though in other contexts. I have included them in the data as new (logical) meanings given to established Latin words.

One of the ways in which new terms are introduced in this text is via the following technique: neologism + cognate verb. So in 194.9–11, Apuleius writes: *u t r i u s v i s h a r u m r e , n i o n a t t i a o m e o n e f t u r t m r a i t u a s l v t i r e v i n c i* ('And as of the refutation of [*r e v*] of one of these near-equals confirms the other, yet the confirmation of one does not refute [*n o n r e v i n c*] the other').[104] The substantive occurs later in the ninth-century archbishop Hincmar's theological works, whereas the verb was well established. RAMSAY argues the lexical innovation of *r e v* 'balances' the two clauses and one can see it working in this manner if we break the sentence down into the following antitheses: *r e v* (--> *c t i n o f ι* and *n a o t n i f o* (--> *r m e a v t .i*. So, in this instance, the formation of a term is not to render a Greek philosophical expression directly or to fill an *e g e* in Latin, but rather for rhetorical balance, creating two clauses with binary grammatical pairs: noun with noun, verb with verb.

6 Chapter Summary

The following quantitative analysis of Apuleius' lexical innovations drawn from his philosophical translations is illustrative.

Apuleius used a number of morphological calques or sense translations, the former most predominantly in the logical handbook the *P e r i H e r* . This *n e i a s* calquing practice would become a critical tool for later Latin philosophers rendering logical terminology in particular, e.g. in Boethius. However, semantic

103 See e.g. *P .l* 11.226 *i n d i g n a t i o e* . This technique is also regularly used in Cicero, as we saw in Chapters 2 and 3.

104 Trans. LONDEY AND JOHANSON (1987), 87.

Category of lexical innovation (*PH* included)	Percentage (total number = 51 lemmata)
Augmentations (semantic calques, etc.)	22% (11)
Sense translations, etc.	33% (17)
First-attested loan-words and loan-blends	0% (0)
Morphological calques	45% (23)

augmentation was also an important tool, outside of the technical handbook style of Apuleius' logical treatise, and we should consider that, of the 23 morphological calques, nearly half can be found in the *Peri Hermeneias* alone. Like Cicero, he was also reticent to rely on Greek loan-words in his translations, unlike some of his predecessors such as Seneca the Younger.[105]

In compiling and analyzing Apuleius' contributions to Latin philosophical vocabulary, we observed that he consciously situated himself within a Latin tradition of philosophical translation, drawing on the technical vocabulary of his predecessors such as Cicero but also explicitly linking himself with their efforts in deploying almost identical rhetorical techniques (*captatio benevolentiae*, *praeteritio*, using the trope of the Latin *egens* in philosophical terminology, etc.). The vocabulary Apuleius introduced in his translations did not have Cicero's magnitude of influence, yet many of his philosophical terms in Latin were nonetheless influential and his translations of Greek would come to impact upon Church fathers such as Tertullian and Augustine (for the latter, see Hagendahl [1967], 680–689), and later Boethius.

There is also the fact that Apuleius was three writers at once: a rhetorician and sophist, a literary fiction author, and a Middle Platonist adherent.[106] The intersection of these produced a novel approach to the interpretation of Greek philosophy and re-imagining it in his native vernacular.[107] Through this renovation of his sources, the use of special terms (both established and newly coined) became crucial in setting out Apuleius' views of Platonism, as it stood in the second century AD. For Apuleius, it was not a matter of repeating Platonic

105 See the discussion of Seneca's reliance on Greek loan-words in his glosses throughout the *Naturales Quaestiones* in Dowson (2023b).

106 See e.g. *Apol.* 22, 39.1, 41.7, 64.3.

107 See Hoenig (2018), 158: '[Apuleius] adjusts and tailors his Platonism carefully to the particular authorial agenda, genre and audience of his works. This strategy is entirely in line with Apuleius' concept of "philosophical rhetoric", a skill he has mastered thoroughly.'

philosophy for students or colleagues, but making sense of it as he understood it and bringing its concepts into a Latin context (for instance, by replacing Greek names for various winds, or the proper names of divinities with Roman ones in his version of the *De Mundo*).[108] This was not always successful and, as we have seen, there were occasional conflations, mistranslations (e.g. of mathematical vocabulary), and a freer, more creative approach to the translation of Greek texts (in the *De Mundo* especially). It is from this evidence that we can continue to argue the contention discussed at the beginning of this book; namely, that there was a clear philosophical tradition in Latin which reinterpreted and renovated the ideas of Greek philosophy from Classical times to Late Antiquity. This tradition became a hybridized transformation, or 'Latinization', of Greek thought, which altered particular terminology in different ways, giving rise to the Roman Empire's own philosophical patrimony in the Latin West.

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108 See e.g. REDFORS (1960), 53, who says about the *De Mundo* that beyond mere *variatio* and poetic or archaic diction, Apuleius pursued genuine 'renovation and originality' in his choice of words.

CHAPTER 5

Calcidius, Cicero, and the *Timaeus*: A Comparative Case Study

Calcidius' interpretation of Plato's *Timaeus* (17a–53c) in Latin, and his accompanying *Commentary*, in the early fourth century AD are important texts to consider in this study, not only on their own merits, but relative to the earlier case study on Cicero's version of the *Timaeus* in Chapter 3. The level of knowledge about Calcidius, spanning scholarship from the late nineteenth century,[1] is lacking and contextualizing the translation proves difficult as a result. In the introduction to his English translation of Calcidius' *Timaeus* and *Commentary*, John Magee (2016) suggested that both works were written at the request (cf. *Comm* 4) of a certain Osius or Hosius, a bishop of Cordoba who participated in the ecumenical councils of Nicea and Serdica in 325 and 343 BC. Evidence for this is inconclusive however,[2] and associated issues such as Calcidius' command of Greek (or simply whether he was Greek himself), or whether his translation exemplifies a Christianizing quality or otherwise, are equally uncertain and some syntactical and lexical peculiarities in his translation both affirm and militate against these questions.[3] I limit the discussion that follows to the translation and philosophical aspects of Calcidius' Latin *Timaeus*, specifically regarding Cicero.

Glucker (1995, 120) characterized Calcidius as a 'more liberal translator' of the *Timaeus* than Cicero.[4] We will see in this chapter that the translation itself is certainly more didactic than Cicero's and there are major additions and excursuses in the text (e.g. on the stars [59–91], demons [127–136], destiny [142–190] and some doxographical additions [275–301]), which suggest Calcidius' version was no mere mechanical translation but functioned

1 See the early works of e.g. Wrobel (1875) and (1876), Switalski (1902) and Steinheimer (1912).

2 See Magee (2016), viii.

3 Magee (2016), xiv–xv; see Hoenig (2018), 161: 'A closer look at Calcidius' vocabulary and syntax, nevertheless, leads to the impression that he was a native speaker of Greek.' For Calcidius' Christianizing tone generally see Waszink (1972), 236; Moreschini (2003) xiv and in his translation of the term for Plato's 'Creator' see Ratkowitsch (1996), 142.

4 Cf. also Müller (1964), 107 who sees the general character of Cicero's version as keeping close to Plato's original with no major transformations.

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as an instructional piece of work upon which the *Commentary* could further expand. Bakhouche (2011, 42) argues the *Commentary* itself was written for a non-philosopher and the liberal use of Greek loan-words in the text with glosses or paraphrases in Latin equivalents suggests this could be a possibility. However, in *Commentary* 3, Calcidius prefaces his work by writing that the book is aimed at more advanced students of other sciences, who might not have philosophical training (*qui in omnium fuerant huius usu atque exercitatione doctrinarum*, 'those who have been versed in the use and application of all such sciences' [cf. *Comm.* 2: arithmetic, astronomy, geometry, and music]). Contrasted with the structure of Cicero's, Calcidius' translation is less liberal with his source material, remaining faithful to Plato's structure, preserving the earlier sections of the dialogue between Socrates, Timaeus, and the other characters and important early exchanges in the Timaean creation narrative (e.g. *Ti.* 27c–d; 29c–d), omitted (or simply lost) in Cicero's version.

There are parallels with Cicero in the re-interpretation of Platonic terminology too. Bakhouche's study provided an overview of Calcidius' translation options when expressing a Greek term for which Latin had no equivalent: either he transliterated the term without an explanation (e.g. *nous* for νοῦς), using a neologism found previously in Cicero (e.g. *medietas* for μεσότης), or created his own term (e.g. *aer inspirabilis* for ἀπτὸν καὶ ἀεροπόρον).[5] As we will see, the first option was confined almost entirely to his *Commentary*, the other two found more commonly in his translation. The second option Bakhouche cites contains within it an important question: did Calcidius have access to Cicero's translation and, further, did he rely on it to some extent? I will address the issue in more detail below, but there is some evidence to show that he might have had access to Cicero's version, yet chose not to use it extensively. What is important is to understand Calcidius' independent approach to the text and thus his translation process. As Reydams-Schils (2020, 217) recently commented on Calcidius' possible source material (e.g. Porphyry or Numenius): 'Rather than attempting to find the smallest number of master sources possible, this study has highlighted Calcidius' own hand in the commentary, not only in the consistent line of interpretation which he advances, but also in his structuring of his material.' This is the approach I will take to the issue of Ciceronian influence on Calcidius' translation. While interesting and worthy of analysis, it is not my contention to prove Cicero's version as the 'master source' or sole influence on Calcidius.

5 Bakhouche (2011), 117 f.

مراجعةسريعة

- تشترك الأعضاء اللمفاوية مع الغدد الخارجية في العديد من الخصائص، مثل المحفظة والحواجز والنسيج الضام والنسيج الحشوي. قد يساعدك مراجعةمعاني هذه المصطلحات وعلاقاتها البنيوية على فهم تشريح الأعضاء اللمفاويةبشكل أفضل (انظر القسم 5.5ب).
- آليات تدفق اللمف تشبه تلك الخاصة بالعودة الوريدية للدم (انظر القسم20.4 أ).
- تلعب الكريات البيضاء دوراً هاماً في المناعة والدفاع بطرق متنوعة. يمكنكالاطلاع بسهولة على أنواع الكريات البيضاء ومظهرها ووظائفهافي الجدول 18.6.
- تتضمن إجراءات الخلايا المناعية ضد عوامل المرض عمليات البلعمة، والبلعمةبوساطة المستقبلات، والإخراج الخلوي الموصوفة في القسم 3.3f.
- تلعب الإيكوزانويدات التي تم تقديمها في القسم 17.6 أدواراً مهمة متعددة فيالعمليات المناعية الموضحة في هذا الفصل.

أدركون من المفاجئ معرفة أن جسم الإنسان يحتوي على عدد من الخلايا البكتيريةلا يقل عن عدد خلايا الإنسان. لكن هذا ليس بالأمر المستغرب. ففيالنهاية المطاف، يعمل التوازن الداخلي للجسم بكفاءة عالية، ليس فقط للحفاظعلى حياتنا، بل لتوفير بيئة دافئة ورطبة وغنية بالعناصر الغذائية لضيوفناالداخليين. ومن العجيب أن الجسم لا يتعرض لغزو الكائنات الدقيقة واستهلاكها،وهو ما يحدث بالفعل بسرعة عند موت أحد أفراده واختلال التوازنالداخلي.

تسُمى الكائنات الحية الدقيقة التي نستضيفها، وخاصة تلك الموجودة في الأمعاء، مجتمعةً بـ**الميكروبيوم**.كثير منها مفيد، بل وضروري لصحة الإنسان،لكن بعضها قد يسُبب الأمراض إذا ما خرج عن السيطرة. علاوة على ذلك،نتعرض باستمرار لغزوات جديدة عبر الطعام والماء اللذين نستهلكهما، والهواءالذي نتنفسه، وحتى الأسطح التي نلمسها. لذا، لا بد من وجود وسيلة لكبحجماح هذه الكائنات الغازية المحتملة.

اكتشفعالم الحيوان الروسي إيلي ميتشنيكوف (1845-1916) إحدى هذه الآلياتالدفاعية عام 1882. أثناء دراسته ليرقات نجم البحر الشفافة الصغيرة، لاحظخلايا متحركة تتجول في أجسامها. ظنّ في البداية أنها خلايا هضمية، لكنعندما رأى خلايا مماثلة في شقائق النعمان البحرية تبتلع جزيئات صبغة غيرمغذية كان قد حقنها، استنتج أنها تؤدي دوراً دفاعياً. كان ميتشنيكوف يعلمأن الخلايا المتحركة موجودة أيضاً في دم الإنسان وصديده، وأنها تحُيط بسرعةبأي شظية تدخل عبر الجلد، فقرر إجراء تجربة لمعرفة ما إذا كانت خلايا نجمالبحر ستفعل الشيء نفسه. غرس يرقة نجم بحر على شوكة وردة، وفي صباحاليوم التالي وجد الشوكة تعجّ بالخلايا التي بدت وكأنها تحاول التهامها. لاحقاً،رأى خلايا مماثلة تلتهم وتهضم الخميرة المعدية في قشريات شفافة صغيرةتسُمى براغيث الماء. وقد صاغ هذا المصطلح *البلعمة* لهذا التفاعل وأطلقواعلى الخلايا المتجولة *الخلايا البلعمية*—مصطلحات ما زلنا نستخدمها حتىاليوم.

أثبتميتشنيكوف أن الحيوانات، بدءاً من شقائق النعمان البحرية ونجم البحرالبسيط وصولاً إلى البشر، تدافع بنشاط عن نفسها ضد مسببات الأمراض.وقد مثلّت ملاحظاته بداية علم المناعة الخلوية والمقارنة، وكسبت له مكانةعلمية مرموقة.

الاحترامالشهرة العالمية الهائلة التي طالما تاق إليها. في الواقع، تقاسم جائزةنوبل في الطب أو علم وظائف الأعضاء لعام 1908 مع بول إرليخ (1854-1915)، الذي طور نظرية المناعة الخلطية، وهي عملية تمت مناقشتها أيضاًفي هذا الفصل.

يركزهذا الفصل بشكل كبير على *الجهاز المناعي*،وهو ليس جهازاً عضوياً، بلهو مجموعة من الخلايا التي تسكن جميع أعضائنا وتدافع عن الجسم ضد مسبباتالأمراض. لكن الخلايا المناعية تتركز بشكل خاص في جهاز عضوي حقيقي،وهو...*الجهاز اللمفاوي*.هذا الجهاز عبارة عن شبكة من الأعضاء والأوعيةالدموية التي تعمل على استعادة السائل النسيجي، وفحصه بحثاً عن مسبباتالأمراض، وتنشيط الاستجابات المناعية، وإعادة السائل إلى مجرى الدم.ومن الجهاز اللمفاوي نبدأ استكشافنا لهذا الفصل.

21.1 الجهازاللمفاوي

مخرجاتالتعلم المتوقعة

بعدإتمام هذا القسم، ينبغي أن تكون قادراً على

أ.اذكر وظائف الجهاز اللمفاوي؛

ب.اشرح كيف يتكون اللمف وكيف يعود إلى مجرى الدم؛

ج.سمّ الخلايا الرئيسية للجهاز اللمفاوي واذكر وظائفها؛

د.تسمية ووصف أنواع الأنسجة اللمفاوية؛ و

هـ.صف بنية ووظيفة نخاع العظم الأحمر، والغدة الزعترية، والعقد اللمفاوية،واللوزتين، والطحال.

ال**جهاز اللمفاوي** (**الشكل 21.1**)يتكون من شبكة من *الأوعية اللمفاوية* التيتخترق جميع أنسجة الجسم تقريباً، ومجموعة من *الأنسجة والأعضاء اللمفاوية*التي تنتج الخلايا المناعية. وتشمل هذه العقد اللمفاوية والطحال والغدةالزعترية واللوزتين ونخاع العظم الأحمر.

للجهازاللمفاوي ثلاث وظائف:

1. **استعادة السوائل.**يتسرب السائل باستمرار من الشعيرات الدمويةإلى الفراغات النسيجية (الخلوية). تعيد الشعيرات امتصاص حوالي85% منه في المتوسط، لكن نسبة الـ 15% المتبقية، والتي لا تمتصها،تعُادل، على مدار اليوم، من 2 إلى 4 لترات من الماء، ومن ربعإلى نصف البروتين الموجود في بلازما الدم. قد يموت الشخص بسببفشل الدورة الدموية في غضون ساعات إذا لم يعُاد هذا الماء والبروتينإلى مجرى الدم. من مهام الأوعية اللمفاوية إعادة امتصاص هذاالفائض وإعادته إلى الدم. حتى التدخل الجزئي في التصريف اللمفاويقد يؤدي إلى مضاعفات خطيرة.**الوذمة اللمفية**((انظر الشكل20.21).
2. **المراقبة المناعية.**أثناء استعادة الجهاز اللمفاوي لسائل الأنسجة، فإنهيلتقط أيضاً الخلايا والمواد الكيميائية الغريبة من الأنسجة. وفي طريقعودته إلى مجرى الدم، يمر السائل عبر العقد اللمفاوية، حيث تراقبالخلايا المناعية باستمرار أي مواد غريبة. وعندما تكتشف أي شيءقد يكون ضاراً، فإنها تفُعلّ استجابة مناعية وقائية.
3. **امتصاص الدهون.**في الأمعاء الدقيقة، توجد أوعية لمفاوية خاصة تسمى *الأوعية اللبنية* امتصاص الدهون الغذائية التي لا تمتصها الشعيرات الدموية.

In *T.* i.35b, Cicero introduced the verbal abstract *c o p u* to translate συναρμόττον. Calcidius translates this with a double translation, which included the established *c o n c* and the rarer *a d u n*, and is attested before Calcidius only in Cyprian (third century), who had used it to describe the admixture of water and wine. Here however, the use of *c o n c* seems to bring in atomism, with the term used elsewhere by Calcidius to convey the atomists' notion of σύγκρισις (*C o m* 220.3, quoting Empedocles). Now, rather than simply a 'joining', Calcidius adds the image of a harmonious 'concretion' of elements—just as the atomists' theory had discussed the concretion of atoms. Again, we see Calcidius either refusing to use, or simply not aware of, a Ciceronian term and, instead, resorting to pleonasm to convey Plato's concept, now with overtones of Epicurean physics.

In *T.* i.46b, Plato discusses the smoothness of a concave mirror as important to its reflective properties:

> **Pl.:** τοῦτο δέ, ὅταν ἡ τῶν κατόπτρων **λειότης**, ἔνθεν καὶ ἔνθεν ὕψη λαβοῦσα, τὸ δεξιὸν εἰς τὸ ἀριστερὸν μέρος ἀπώσῃ τῆς ὄψεως καὶ θάτερον ἐπὶ θάτερον
>
> But this (occurs) whenever the smooth surface of the mirrors, being elevated on this side and on that, repels the right portion of the visual stream to the left and the left to the right.
>
> **Cic.:** *i d f ı t c u m l e v i t a s e h c i u n l c o i r l u l m i n c q u e a l t i t u a i t a d e x t e r a m d e t r u s i t i n l a e v a m p a r t e*
>
> That happens when the smoothness of the mirror, which is elevated on one side and on the other, thus reflects the right side into the left part of the eyes and the left side into the right part of the eyes.
>
> **Calc.:** *q u o d q f u i t t i e n s s e r e n i t a s l a t e r i s n p c e i c m u l d i t u m i d i c p r o v e c t i s i n m o l e m l a t e r i b u s , d e a x e t r a m v a m i t e m i n d e x t e r i o r a d e i e c i t*
>
> Which happens whenever the smoothness of the mirror, with its sides protruding and built up in elevation, drives the visual ray from one direction to the other, the one on the right side to the left side of the mirror and likewise the one on the left side to the right.

Instead of using *l e v*, Calcidius employs a semantic calque, changing the usual usage of *s e r e* (*OLD* s.v. 5a dry, bright condition of the air or sky'; 2.

[fig.] 'favourableness of conditions') to the 'smoothness' of an object's surface (e.g. a mirror's). In English, we associate synonyms in a similar way (such as smoothness, stillness, serenity, flatness especially of weather conditions), but here it is applied to the surface of a mirror. The -*t* abstract is retained, finding a correspondence to λειότης, but *l e v* is disregarded in favour of another abstract, now given a new sense. Note also that Cicero's translation of 46a does not survive but, in the Greek text, the abstract λειότης and its adjective λεῖος are used several times and Calcidius translates these via the technique of *v a r i* So εὐφάνῃ καὶ λεῖα becomes *q u a e i n h u m i d a c e r n u n t* περὶ τὴν λειότητα becomes *i n t e r s a m a l i q u a m l e v e m q u e* and περὶ τὸ λεῖον καὶ λαμπρὸν συμπαγοῦς (46b) becomes *e x l e v i t a t i c o r p s p e. c t u*

There are also examples where no creative impulse seems to lead Calcidius to ignore the Ciceronian term, but rather clarity of expression appears to be the motivating factor. In *T i m* 12, Cicero uses the compound *u n i g e n a* dering μονογενής (*T .i.* 31b), whereas Calcidius prefers the more common term *u n i : c u s*

> **Pl.:** διὰ ταῦτα οὔτε δύο οὔτ' ἀπείρους ἐποίησεν ὁ ποιῶν κόσμους, ἀλλ' εἷς ὅδε **μονογενὴς** οὐρανὸς γεγονὼς ἔστιν καὶ ἔτ' ἔσται
>
> Because of these things, its Maker made neither two universes nor an infinite number, but there is and will continue to be this one generated Heaven, unique of its kind.
>
> **Cic.:** *i d c i r c o s i n g u l a r e m u [illegible] n p h r u o n c c r e u a n v d i u t*
>
> For this reason, God created a singular, one-of-a-kind Universe.
>
> **Calc.:** *i d c i r c o n e q u e d u o n e c [illegible] e s t*
>
> For this reason, not two nor an innumerable number of Universes were created by god, but a unique one.

Calcidius' translation captures Plato's original more closely than does the terser Ciceronian version, hence ἄπειροι κόσμοι becomes *i n n u m e r a* and *l e s m u* the more literal sense of 'making' conveyed in ποιέω is translated with *f a c t u s e s t* in Calcidius' Latin, as opposed to the more organic metaphor of 'procreating' in Cicero's *p r o* . The emphatic *n e q[.u]* construction mirrors Plato's

original again more precisely than Cicero's double translation: *s i n g u l a r i s e t g e n u i* Calcidius avoids the poetic *u n i g e n u s* and uses the more straightforward *u n i* to describe the Universe.

However, there are some instances where Calcidius does not use Cicero's terms to the detriment of his own translation, for example in the rendering of δύναμις in *T.* 41c which Cicero had translated with *v i* but which Calcidius instead translates with *s o l l* 'skill' which, as BAKHOUCHE has noted,[25] is a 'strange' translation that weakens the sense of the Greek original:

> **Pl.:** μιμούμενοι τὴν ἐμὴν δύναμιν περὶ τὴν ὑμετέραν γένεσιν
>
> Imitating the power shown by me in your creation.
>
> **Cic.:** *i m i t e m i n m e a q u a m e i n v e s t r o o r t u u s u i s t i s*
>
> And you may imitate my own power, which you recalled was used in your generation.
>
> **Calc.:** *i m i t a n t e s e r g o m e a m s o l l e r t i a m a e f f e c t u m*
>
> Therefore imitating my skill as in your production.

There is a question here of interpretation which illustrates Calcidius' understanding of the Platonic Creator. The use of δύναμις in Greek authors varied from a physical 'force' to a more abstract concept of 'means, skill' (compare LSJ s.v. A and II. 1–2 for the former with II. 3 for the latter). In Latin, the term *v i* is much less nuanced and carries the primary meaning of physical force. It appears that Calcidius construed the 'potentiality' of the Creator as something more abstract rather than physical and associated more with *s o l l* than *v i*. This is a salient detail here in Calcidius' version is that in the generation of mortals by the gods the Creator orders the gods to imitate the skill of the Creator himself, not necessarily his physical 'power'.

An interesting case is Calcidius' *c o m p e* for Plato's ἀναλογία, which, as we have discussed in Chapter 3, Cicero translated with *p r o p*. The *Thesaurus Linguae Latinae* (s.v. *c o m p*, 3e2 0168 09) defines the adjective with the following synonyms, among others: *c o n v e n i e n s, c o n s e n t a n e u s, p r o p r i u s, a p t u s, c o n s e n t i e n s*, 'consistent, just, proper,

25 See BAKHOUCHE (2011), 118 and 614.

congruent, fitting'. A similar usage to Calcidius' is in Aulus Gellius (19.13.3): *adhibita quadam ratione etymologiae cuius* 'having applied by a certain etymological reasoning *congruens sententiae* the sense fitting to the word.' However, here there is a sense of similarity or resemblance, whereas Plato is discussing the bonds between geometric solids, specifically the mathematical proportionality of these bonds, not the resemblance or agreement between them. We can understand intuitively why Calcidius has extended the semantic range of *compar* from these broader senses to the more specific 'proportionality' connotation in Plato's geometry, but the meaning is extended to include the concept of 'likeness'. This was probably a deliberate semantic shift to incorporate into the notion of proportionality a sense of 'similarity' or 'agreement', as we see his explanation later in *Commentaario vero naturae licet sint contrariae, habent tamen* 'Indeed it is granted that they (sc. geometric solids of fire and earth) are of contrary natures, however they possess a certain likeness from their very contrariety.' The term *compar*, therefore, serves a broader purpose, not only to illustrate that geometric solids can be unified in proportional geometric ratios, but that they are unified *because* of a similarity or *similitudo* (*Ciotti* 2020). This semantic aspect is not present in Cicero's *proportio*. Calcidius later uses the loan-word *analogia* alongside *comparatio* (e.g. *Comm.* 119) to describe the same concept, but the word *proportio* is never used in either his translation or the *Commentary*, despite its usage in arithmetic and music by Calcidius' time.[26]

There are also instances where Calcidius does not follow Cicero's terms but instead uses either loan-words or more rarely, post-Classical terms in his translation to convey, sometimes more precisely, the Greek expression. So we find *modulatio* for ἁρμονία in the Pythagorean sense of 'euphony' or 'harmony', which Cicero had rendered with *concentus*, a less exact term conveying a 'singing-together' rather than the mathematical notion of the harmonic measure or interval (*modus*). Instead of Cicero's sense translation *cuneolus* for γόμφος, Calcidius cycles through a series of options for the reader in his *Commentary on Timaeus* 43a and simply uses the Greek term directly (*gomphi*),[27] or in conjunction with entire clauses to explain these 'minute combin-

26 The *TLL* s. v. (1.2.2078.36) lists the term applied to arithmetic in authors such as Favonius Eulogius, a pupil of Augustine's, and Sidonius Apollinaris. This is interesting, given the similarities between Favonius' work and Calcidius', see Dorfbauer (2011), who suggests Favonius might have read Calcidius.

27 This has not been recorded as a first-attested loan-word in Calcidius since we find it with the same sense earlier in Statius (*Si.* 4.3.48) and possibly Tertullian also (*Ap.* 22.4).

ations' as *minorum corpuscula, leorrum molem omnes rimaitliiounm congloba tio*, among other descriptors, as the omized in different philosophical schools (quoting Diodorus, Anaxagoras, Democritus, Leucippus, Empedocles, and *non nulli*).[28] In this way, Calcidius' terminology could manoeuvre between a nominalized approach to term formation using a single substantive (the Greek loan-word itself) or a series of pleonasms in paratactic clauses, between a 'compact' to a 'diffuse' style, to use LANGSLOW's phrasing, or as HALLIDAY (1988/2004, 157) had described, less about 'thinginess' and more reliant on lengthy description using entire clauses to convey certain concepts in Latin.

The argument that Calcidius 'consciously avoided' Ciceronian vocabulary in his own translation as an attempt at originality and creativity runs the risk of using circular logic; that is, it assumes he knew of Cicero's version and avoided it. It is possible, of course, that he simply did not have access to Cicero's translation and was forced to resort to coining his own terms for Greek words, the same way Cicero had done centuries before. Another issue is that throughout all the post-Classical authors we have surveyed the appeal to the authority of Cicero's lexical choices has been frequent, if not a cliché, and Calcidius certainly does this with *essse* as Seneca had done centuries earlier, but it is not clear if this is a direct appeal to Cicero's *Timaeus* or just to a tradition that had characterized the term as a characteristic Ciceronian coinage. We could attempt to answer such problems by suggesting that even if Calcidius had some knowledge of Cicero's translation, his aim was not *imitatio* but rather *aemulatio*—as Cicero's aim had been with his Greek sources. His version was original and creative rather than derivative and reliant on earlier versions in Latin. There are numerous issues and, we could speculate further by asking whether there were external pressures on Calcidius from the Bishop of Cordoba for a new and original version, stripped of the old pagan vocabulary of Cicero or whether Calcidius was simply self-aware of his place in a translation tradition in Latin, one which he did not want to imitate but to expand upon and make his own. I have hoped to demonstrate at minimum that, if we do accept the assumption that Calcidius had some kind of access to Cicero's version, there is at least some linguistic evidence, especially through the lens of lexical innovation, to confirm this.

28 See also discussion of Calcidius' translation of these *gomia* in VAN WINDEN (1965), 68–69.

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nical writing. However, semantic augmentation and sense translation practices are also large, accounting for nearly 30% of the data collected throughout Boethius' translation texts. This increased reliance on formal literalness and technical writing occurred, I suggest, for two main reasons: the subject matter and the emphasis on didacticism. Both Apuleius and Boethius took a technical and literalist approach to translation with this particular subject of logic and there we find an increased usage of these types of lexical innovations. Boethius expressed his intention to replace Latin students' reliance on Greek philosophical texts and designed his translations, and their novel terminology, to be didactic in purpose. These functioned almost as *Ers*-Greek versions, now transferred into Latin (a closer instance of what we today think of as 'translation'), rather than creative or more literary works, as Cicero had composed in his *Timaeus* or Apuleius in his *De Mundo*.

3 Findings Compared with Other Technical Vocabularies

Many of the observations throughout this study corroborate findings in the research of other technical vocabularies of Latin. In ADAMS' study of veterinary terminology, for instance, it was observed that there were at least seven specific techniques in which technical terms could be formed by *veterinarius* (later known as *mulomedicina*) and non-specialists working in the same subject (1995, 671). For example: (i) Greek loan-words; (ii) specialized established terms; (iii) metaphors; (iv) shifts of meaning (metonymy); (v) compounding; (vi) coinage by suffixation; and (vii) phrasal terms. This study of Latin philosophical terminology formed from the translation of Greek has encountered each of these same kinds of practices to varying degrees, with techniques such as (ii) to (iv) and (vii) relied upon to a greater extent in earlier authors in the tradition than in later ones. This was largely due to the literal translation of Greek philosophical vocabulary increasing as pedagogical methods became more precise and the goal of remaining faithful to the sources was more essential. So too in the field of Latin medical authors, LANGSLOW's study observed the following (2000, 418): '[A] significant development over time which one might infer from [the medical texts surveyed] is that the "scientific" style in Latin texts of "high" medicine becomes increasingly regular, consistent and—most important for its survival—acceptable in elite circles' and (2000, 432): 'It struck me [...] that all the means of term formation considered may be seen as "conspiring" towards a formal compression of names for medical things (with considerable regularity according to lexical field) and thus as tending to favour the "compact" ("noun-based") style of writing.' Simil-

arly, where earlier writers such as Lucretius or Cicero relied to a greater extent on a 'diffuse' approach, to use Langslow's word, in translating Greek terms (e.g. relative clauses, circumlocutions, metaphorical language, or other linguistic devices, often for stylistic reasons, such as poetic diction or Latin prose style), as philosophical terminology became more specialized and technicalized (sc. scientific or 'compact') over time, the names for philosophical concepts in Latin became more profuse. The reservations earlier authors might have had regarding the style and acceptability of new Latin terms to translate Greek (e.g. nominalizations through morphological calquing) fell away by the time of authors such as Boethius, who had fewer aversions to these stylistic restrictions in his translations. Philosophical translation in Boethius' works became more 'compact' and term-based, and the specific philosophical subject matters therefore became increasingly replete with new jargon (not simply when it came to Latin nouns and adjectives, but its verbs as well). As Halliday explained in the context of early scientific literature in English (1988/2004, 95 and 157), this trend towards 'thinginess' or the nominalization of processes and phenomena had deep implications, not just for the theories and discourse of the specialized field in which the lexicalization of terminology occurs, but for its broader 'ideology'. As he wrote: 'Ideationally, the nominalizing grammar creates a universe of things, bounded, stable and determinate; and (in place of processes) of relations between the things.' In Latin philosophical expression as well, there was a preference in the late antique era for a more taxonomic and name-based approach to term formation, especially in subjects such as logic, but similarly in other areas of philosophy.[8] However, this trend had been instigated as early as Cicero, whose approach to coining new philosophical terms in Latin through an extensive use of abstractizing suffixes (especially those such as *-t ioro-t ḍ*) in place of phrases was significant.

A further connection that the results of this study share with other fields, and that will be discussed in more detail in the next section, is the notion of renovation from Greek into Latin, for example in the subject of grammar, especially prosody. We can note Probert's (2019, 282) conclusion with respect to Latin grammatical authors' use, and transformation, of Greek prosodic concepts: 'What enabled Roman scholars to take these concepts over was not that they simply copied Greek models blindly, nor that the two languages behaved identically on every point. Roman scholars were able to take these concepts

8 Compare, for example, the highly technical theological writings of Marius Victorinus in the fourth century with respect to Christian doctrinal vocabulary.

over because they understood and transformed them in ways that made them give the results they considered correct for their own language.' Similarly, in each of the case studies we saw Latin authors mostly avoid using loan-words outright in the creation of Latin terms and instead occasionally altering certain Greek concepts, often significantly, to fit the stylistic and cultural contingencies of Latin.

4 Summing up: Republican-Era Authors

We began the book with a unique case study: the poetry of Lucretius, whose Epicurean hexameters in the *De Rerum Natura* were strictly confined by factors such as metre and poetic diction. Lucretius first invoked the *egestas* topos in the beginning of his poem to forewarn his readers that the novelty of the subject matter with which he was dealing would necessitate many *nova verba*. However, we saw throughout Chapter 1 that Lucretius rarely had recourse to outright neologism (morphological calques or sense translations); he preferred to approach Epicurean technical terms using semantic augmentation practices, such as semantic extensions of existing Latin words or novel metaphorical usages. Lucretius' genius was in his ability to express difficult philosophical concepts in new and innovative ways through his command of the poetic medium in which he wrote, rather than a literal adaptation of his source material. By refusing to develop a distinct or consistent 'terminology' within his poetry, Lucretius gave himself flexibility in lexical choices, sometimes using well-established words in novel and technical ways (semantic calques), other times using them more ordinarily, keeping his Epicurean poetry connected with the everyday language of Roman speakers.

We then proceeded to the most extensive and significant case study of the book, which analyzed Cicero's translation techniques when adapting Greek philosophical terms into Latin. The prose works rapidly composed during the end of his life suggest an author who, like Lucretius, had a mastery of diction within Latin, preferring semantic shifts, pleonasms, or metaphor to convey the senses of specific terms. However, Cicero's prose-based compositions afforded him even greater leeway when it came to glossing and paraphrasing Greek terms—advantages not available to Lucretius. Yet even with this freedom in literary form, Cicero's reliance on Greek loan-words or code-switches was sparse (often largely for rhetorical purposes). Chapter 2 also discussed the notion of a quasi-hermeneutic in Cicero's translation 'praxis', in which he was self-conscious of Latin style and metatextual considerations in his literary works and of his target audience. As to the former, Cicero was careful in choosing

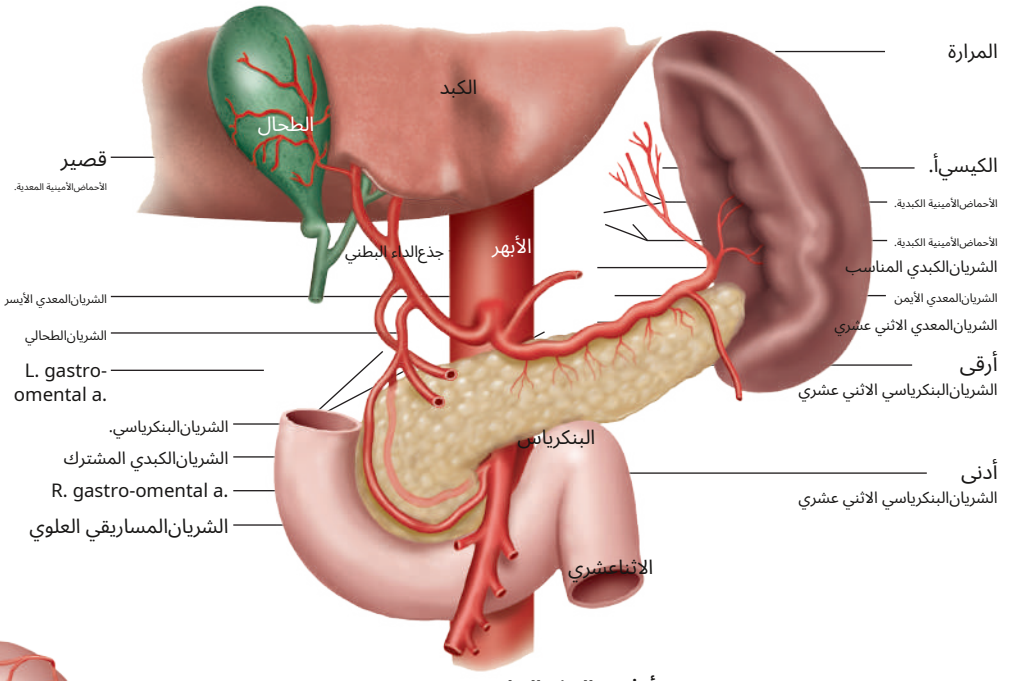
rhetorical techniques where neologism was required, for example, the introduction of terms such as *qualitas* and *materia*, where we saw the devices of *praetextatio* and *circumscriptio* employed to ease the reader into gradual familiarity with his new terminology. As to the latter, I argued that Cicero was acutely aware of the cultural and socio-linguistic factors that shaped the interpretations of specific philosophical expressions. As seen in the discussion of *officium* for the Stoic καθῆκον, the 'translation' of such a term was not simply one of transferral of meaning, but rather a transference from one set of cultural values to another. In the case study on Cicero's *Timaeus*, we analyzed in Chapter 3 the work as a literary translation rather than a didactic replication of Plato's text, with the full array of translation techniques engaged to convey the creation narrative in Latin for the first time. Some of the translation choices in this project, such as the metaphorical physicality of *materia* for οὐσία and the conception of the relations between ἀίδιος and αἰώνιος and *aeternitas* and *perpetuitas* as central ontological concepts, would exercise a significant influence upon later Latin philosophers discussing Platonic metaphysics. Lexical innovation became a tool for Cicero to showcase his originality in translation, but it also demonstrated his extensive knowledge of Greek sources and their philosophical expressions. All this took place in the shadow of the *egestas* trope, which Cicero largely defied. We observed that over 50% of Cicero's lexical innovations in his *philosophica* were adapted from existing Latin words, while only less than 5% relied upon loan-words or loan-blends from Greek. These quantitative insights alone provide evidence that Cicero's conservative approach to translating Greek philosophical terminology into Latin was one of innovation and *aemulatio*, laboriously attempting to adapt and renovate Greek expression for his own purposes, rather than merely imitating his sources and conceding Greek terminological dominance. This renovation and originality produced a home-grown Latin philosophical tradition that would eventually exert a lasting influence on Latin philosophical writing during the Imperial era and into Late Antiquity.

5 Summing up: Imperial-Era and Late Antique Authors

By the time of the Middle Platonism of Apuleius, we encountered another orator-philosopher in the Ciceronian tradition, though geographically and culturally quite different. In his logical handbook, the *Peri Hermeneias*, Apuleius was less concerned with linguistic purism or a form of 'patriotism through translation', but was engaged in bringing many Greek logical terms into Latin. However, in his translation of the Pseudo-Aristotelian *De Mundo*, we also observed

that he did not employ literal renderings of Greek terms to a great degree, but preferred to expand upon the original text with his own additions, apparently aiming for a composition both literary and philosophical in style. The chapter also examined his philosophical primer *De Platone et eius Dogmate* to show how Middle Platonic influences affected the translations of important terms. The intersection of Apuleius' roles as sophist, literary author, and acolyte of the Middle Platonic school afforded him a unique position, like Cicero, in the tradition of Latin-speaking intellectuals who made lasting contributions to the Latin philosophical vocabulary.

Chapter 5 moved to the fourth century AD and examined the relatively unknow figure of Calcidius and his famous translation and commentary of the *Timaeus*, comparing his version with Cicero's. We inferred two important conclusions: (1) Calcidius' translation was more didactic, given the accompanying *Commentary* that was produced, and it aimed to include all of Plato's dialogue, unlike Cicero's shorter version (either because he chose to omit sections of the dialogue or because these did not survive into posterity); (2) Calcidius possibly aimed to differentiate himself deliberately from Cicero's earlier version. The explanation for this can be ascribed to context; the process of translating Greek philosophy into Latin in Calcidius' time was a different endeavour than in Cicero's. Calcidius might have been commissioned by a Christian bishop to complete the translation of Plato and his Latin version does not rely on literal techniques such as morphological calquing. Rather, the text is often embellished with creative additions and poetic terms, adding literary qualities to the translation. This is an interesting fact, given the prominence of Christian doctrinal translation during Calcidius' era and the reliance on literalism when translating source texts, especially with respect to the Scriptures, for example. Calcidius' approach to the *Timaeus* themselves both original and creative in a way that evoked Cicero's attempt centuries earlier. In his *Commentary*, we observed that Calcidius' approach became much more literal than his translation, freely using Greek loan-words and glosses throughout his longer discussions of Platonic doctrine. Calcidius' techniques in term formation shared similarities with Cicero's inasmuch as he used occasional periphrases or circumlocutions, but also multiple translations for single Greek terms. Calcidius used established Latin words around 50% of the time in his translation and added to them novel senses to transfer Platonic expressions into Latin. In his *Commentary*, his reliance on such semantic augmentation practices was less than half as frequent. I argued that Calcidius was consciously operating within the same tradition as Cicero, on occasion even directly appealing to his authority in the selection of certain terms. Although, by his time, he had at his disposal a greater range of philosophical vocabulary, he would still turn to poetic or rare forms when



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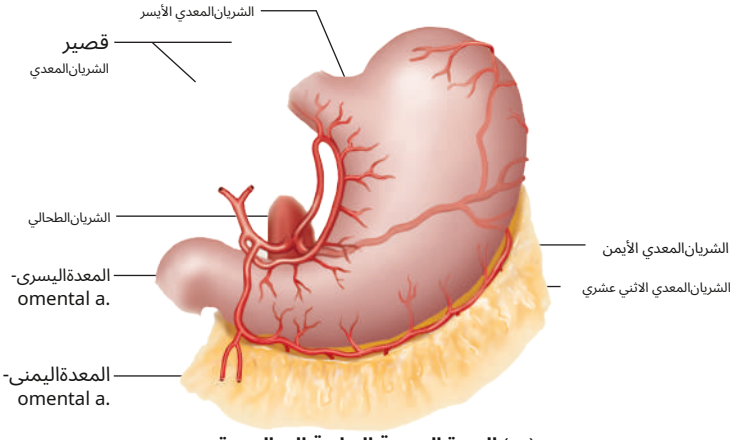
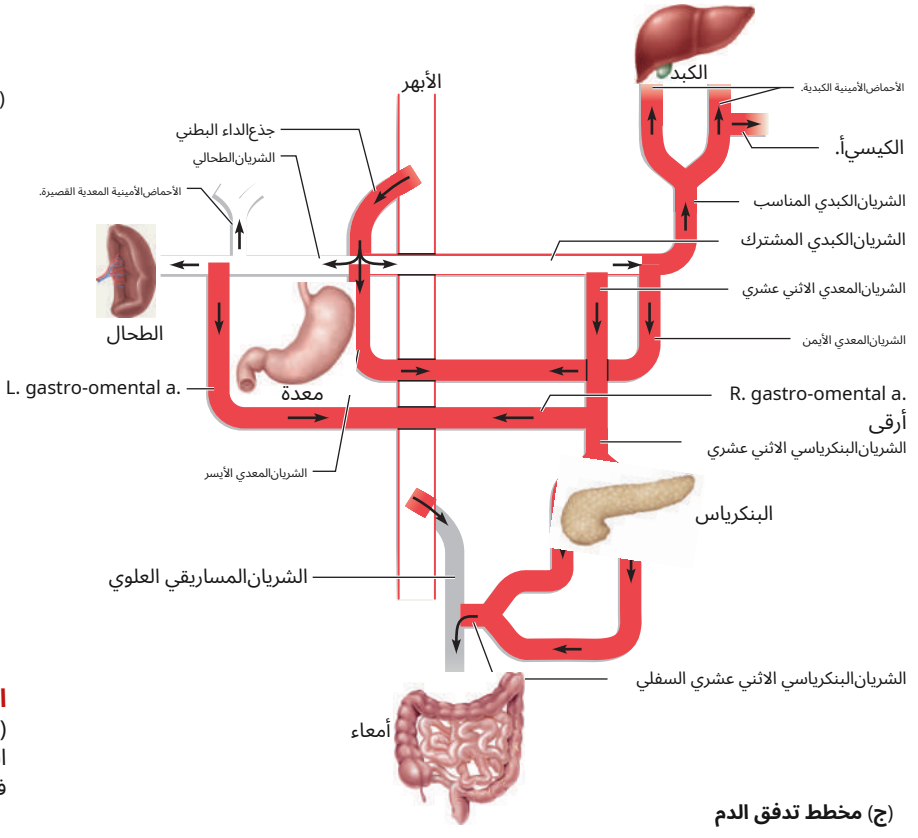


(ب) الدورة الدموية البطنية إلى المعدة



(ج) مخطط تدفق الدم

الشكل20.35فروع الجذع البطني.
(أ) تشريح الجهاز الهضمي بعد إزالة المعدة لكشف الشرايين الخلفية.(ب) التروية الشريانية للمعدة. (ج) مخطط تدفق الدم في الجهاز الهضمي.